



FRIDAY, FEBRUARY 4, 1881.

Train Accidents in December.

The following accidents are included in our record for the month of December:

REAR COLLISIONS.

Very early on the morning of the 1st a freight train on the New York, Lake Erie & Western road broke in two near Ridgewood, N. J., and the rear section afterward ran into the forward one, wrecking several coal cars and blocking one track three hours.

On the morning of the 1st a freight train on the New York Central & Hudson road ran into a preceding freight which had stopped near Rome, N. Y. The engine was damaged, several cars wrecked, and the wreck caught fire and was burned up. The first train sent back a signal, but the second was so close behind that it could not be stopped in time.

On the morning of the 2d a freight train on the Buffalo & Southwestern road broke in two near Warren, N. Y., and the rear section ran into the forward one, wrecking several cars and injuring a brakeman.

On the night of the 3d a passenger train on the Cleveland, Tuscarawas Valley & Wheeling road ran into some ore cars standing on the track in Bridgeport, O., doing some damage.

On the morning of the 4th a passenger train on the Chicago & Northwestern road ran into the rear of a preceding passenger train which had stopped near Carey, Ill., on account of the breaking of a spring-hanger on the engine. The rear engine and a passenger car were damaged, one passenger badly and five slightly hurt. The first train sent back a flag, but the morning was foggy and the brakeman could not get back far enough to stop the second train in time.

On the morning of the 4th a passenger train on the Utica, Clinton & Binghamton road ran into an engine standing in the yard at Utica, N. Y., damaging the tender.

On the night of the 4th a Baltimore & Ohio freight ran over a misplaced switch and into the rear of a Pittsburgh, Cincinnati & St. Louis freight standing on the siding at Union, O., on the track used in common by both roads. The engine and several cars were wrecked and a brakeman fatally hurt.

On the morning of the 5th a passenger train on the Pennsylvania Railroad ran over a misplaced switch and into the rear of a coal train standing on a siding in Elizabeth, N. J. The engine was damaged, the caboose and several cars wrecked and a fireman hurt.

On the 5th a yard engine on the Atlantic, Mississippi & Ohio road, while running backward in Petersburg, Va., ran into the rear of a freight train. Several cars and the tender were wrecked and the engineer hurt.

On the evening of the 5th a freight train on the Pennsylvania Railroad broke in two near McGarvey's, Pa., and the rear section afterward ran into the forward one, wrecking 15 cars.

On the evening of the 5th a freight train on the Pennsylvania Railroad broke in two at Gallitzin Cut, Pa., and the rear section afterwards ran into the forward one, wrecking two cars.

Early on the morning of the 6th a freight train on the Wabash, St. Louis & Pacific road ran into the rear of a preceding freight, which had stopped near Danville, Ill., piling up a number of cars in a bad wreck, which blocked the road 12 hours. There was a thick fog at the time.

On the morning of the 6th a passenger train on the New York Central & Hudson River road ran over a misplaced switch and into the rear of a freight train standing on another track at Byron, N. Y., wrecking the caboose.

On the 6th a passenger train on the North Division of the Chicago, St. Paul, Minneapolis & Omaha road ran into the rear of a freight train which was stalled on a grade near Echo Lake, Wis., wrecking several cars.

On the afternoon of the 7th a freight train on the Pennsylvania Railroad ran into another freight standing in the yard at Altoona, Pa., wrecking several cars.

On the 8th a passenger train on the Manhattan Elevated road ran into the rear of an empty train which had just backed over a misplaced switch out upon the main track, at One-hundred-and-nineteenth street, in New York.

On the 9th a passenger train on the Louisville, Cincinnati & Lexington road ran over a misplaced switch and into a freight train standing on a siding at Taylor's, Ky., damaging several cars.

On the evening of the 9th a passenger train on the Baltimore & Ohio ran into the rear of a local freight, which was stopping to load up freight, at Webster, W. Va. The way car was wrecked.

Very early on the morning of the 11th a freight train on the Lake Shore & Michigan Southern road ran into a preceding freight at Vermillion, O., wrecking the caboose and injuring a brakeman.

On the afternoon of the 11th a passenger train on the Chicago, Burlington & Quincy road ran over a misplaced switch and into the rear of a freight train standing on a siding at Malden, Ill. The passenger engine and several freight cars were wrecked, the engineer and fireman hurt.

On the 11th a freight train on the Southern Pacific road broke in two near Mohave, Cal., and the rear section afterward ran into the forward one, wrecking 17 cars.

On the night of the 11th a Pan-Handle yard engine ran into a Vandavia switching train on the Jeffersonville, Madison & Indianapolis Y in Indianapolis, Ind., wrecking three cars.

On the night of the 13th a freight train on the Macon & Brunswick road ran over a misplaced switch and into a ballast train standing on a siding at the 127-mile post near Eastman, Ga. The freight engine and several gravel cars were wrecked, the engineer and fireman hurt.

On the 14th a freight train on the Boston & Lowell road ran over a misplaced switch and into the rear of another freight standing on a siding in East Cambridge, Mass. Two cars were thrown over against a small house adjoining the track, tearing down one side of it and injuring three persons who were in it.

On the morning of the 16th a Wabash engine ran into a Michigan Central freight train near the stock yards in Chicago, Ill., damaging several cars.

On the 16th a passenger train on the Troy & Boston road ran into the rear of a freight train at Hoosic junction, N. Y., wrecking the caboose.

On the night of the 18th a freight on the Vermont Central road ran into the rear of a preceding freight which had stopped for wood at Richmond, Vt., damaging the engine and several cars.

On the evening of the 19th a yard engine on the Pittsburgh, Ft. Wayne & Chicago road ran over a misplaced switch in Chicago, Ill., and into a freight train on the main track,

wrecking two cars, damaging the engine, injuring the engineer, fireman and a brakeman.

On the afternoon of the 20th a passenger train on the Intercolonial road ran into the rear of a coal train near Metapedia, P. Q., wrecking several cars. Two train-men were hurt, and the caboose burned up.

On the afternoon of the 20th a freight train on the Pennsylvania Railroad ran into the rear of a preceding freight at Erinton, Pa., doing some damage.

On the evening of the 22d a wild engine on the New York, Lake Erie & Western road ran into the rear of a freight train near Turners, N. Y., wrecking a car.

About noon on the 23d a Pennsylvania freight train ran into the rear of a Baltimore & Ohio passenger train on the Junction Railroad in Philadelphia, damaging a car.

On the morning of the 27th a freight train on the Atlanta & Charlotte Air Line ran into some cars which had broken loose from a preceding freight near Paw Creek, S. C. The engine was badly broken, the caboose and several other cars piled up in a bad wreck. Three persons in the caboose were killed, the engineer and two others hurt. The detached section of the first train sent back a flag, but the flagman was stopped by a high trestle and the second train could not stop in time on account of the heavy grade.

On the morning of the 30th a freight and emigrant train on the Union Pacific road broke in two near Lodge Pole, Neb., and the rear section afterward ran into the first, wrecking several cars and injuring five persons.

On the morning of the 30th a passenger train on the Canada Southern road ran into the rear of a local freight near Welland, Ont., wrecking several cars and injuring two train-men.

On the morning of the 31st a passenger train on the Western & Atlantic road ran into the rear of a freight which was just going into a siding at Gilmer, Ga., wrecking the caboose.

On the afternoon of the 31st a wild engine on the Cherokee road ran into the rear of a passenger train, which was stopping at Stilesboro, Ga., damaging a car.

BUTTING COLLISIONS.

On the 1st a wild engine and a freight train on the Ogdensburg & Lake Champlain road had a butting collision near Wood Falls, N. Y., by which both engines and several cars were badly damaged. The Superintendent and a director, who were on the wild engine, were slightly bruised. The accident was caused by a misunderstanding of orders.

On the 3d a switching engine ran into the head of a freight train in the Wabash, St. Louis & Pacific yard in LaFayette, Ind. Both engines were slightly damaged.

On the afternoon of the 3d there was a butting collision between a passenger train and a yard engine on the Baltimore & Ohio road at Camden Station in Baltimore. Both engines were damaged.

On the evening of the 7th a freight train on the Troy & Boston road broke in two near Johnsonville, N. Y., and the detached cars ran back down grade and into the head of a following freight. The engine and three cars were badly damaged.

On the 9th some freight cars on the Detroit, Grand Haven & Milwaukee road which had been left standing on a grade in Detroit, Mich., had the brakes started by some boys, and ran down a grade and into the head of a freight train coming out of the yard. An engine and several cars were damaged.

On the 9th there was a butting collision between two freight trains on the Lake Shore & Michigan Southern road near Oberlin, O., by which both engines were damaged and an engineer hurt.

On the 9th there was a butting collision between two freight trains on the Mobile & Ohio road at Citronelle, Ala., by which both engines were somewhat damaged.

On the morning of the 13th in the Boston & Providence yard in Boston, Mass., there was a butting collision between a passenger train and a yard engine which was hauling a passenger train out of the depot. Both engines were damaged and some supports knocked out from under an overhead bridge.

On the 15th there was a butting collision between a passenger and a construction train on the Oregon Railway near Blalock's, Or., by which both engines and several cars were wrecked and an engineer hurt.

On the evening of the 22d there was a butting collision between a passenger and a freight train on the Burlington, Cedar Rapids & Northern road near Rockford, Ia., by which both engines were wrecked, an engineer killed and a fireman hurt. The freight engineer was running on the passenger train's time, but thought he could reach Rockford first.

On the afternoon of the 24th there was a butting collision between a passenger and a freight train on the Atlanta & Charlotte Air Line near Norcross, Ga., by which both engines and several cars were wrecked and the engineer and fireman of the passenger train killed. An order had been sent to the passenger train directing where the freight should be met, but it is said that an operator failed to deliver it, giving the conductor an earlier order instead.

On the morning of the 26th there was a butting collision between a passenger and a freight train on the Mobile & Ohio road near State Line, Miss., by which both engines were wrecked, two engineers and two brakemen killed, and five others hurt.

On the afternoon of the 28th there was a butting collision between a freight and a passenger train on the Cincinnati, Sandusky & Cleveland road near Tiffin, O. Both engines were wrecked, the baggage and express cars were piled up together, caught fire and were destroyed. A fireman was killed, an engineer, the express agent, mail agent and one passenger hurt. The engineer of the freight started from Tiffin without orders; after the accident he disappeared.

On the morning of the 30th there was a butting collision between a passenger and a water train on the Union Pacific road, by which both engines were damaged and four train-men slightly hurt.

On the morning of the 31st there was a butting collision between a freight and a local passenger train on the Pittsburgh, Cincinnati & St. Louis road near North Mansfield, Pa. Both engines were badly wrecked, an engineer seriously and three passengers slightly hurt.

CROSSING COLLISIONS.

Very early on the morning of the 8th a Troy & Boston passenger train ran into a Boston, Hoosac Tunnel & Western freight at the crossing in Hoosic, N. Y. An engine and a freight car were wrecked and the mail car damaged badly.

On the 8th a Columbus & Toledo freight train ran into a Pittsburgh, Fort Wayne & Chicago freight at the crossing in Upper Sandusky, O., damaging an engine and coal car.

On the afternoon of the 18th a Philadelphia & Atlantic City passenger train ran into a Camden, Gloucester & Mt. Ephraim construction train at the crossing of the two roads in Camden, N. J., wrecking several gravel cars and injuring three laborers.

Very early on the morning of the 20th a Chicago, Burlington & Quincy freight ran into a Wabash, St. Louis & Pacific freight at the crossing in Chapin, Ill. An engine and three cars were badly broken.

DERAILMENTS, BROKEN RAIL.

On the 3d a passenger train on the Chicago, Burlington

& Quincy road struck a broken rail near Beardstown, Ill., and several cars were thrown from the track, one going into a ditch.

On the evening of the 6th a passenger train on the Chicago, Rock Island & Pacific road struck a broken rail near Edgerton Junction, Mo., and three cars were thrown from the track and down a bank. The wreck caught fire and was burned. The mail agent was burned to death and two other train-men hurt.

On the night of the 7th a passenger train on the Chicago & Northwestern road struck a broken rail near Lake Geneva, Wis., and two cars were thrown down a high bank, injuring three persons.

On the 9th a freight train on the Wabash, St. Louis & Pacific road struck a broken rail near Logansport, Ind., and four cars were wrecked.

On the evening of the 10th a passenger train on the Chicago & Northwestern road was thrown from the track near Charlotte, Ia., by a broken rail. The whole train went down a high bank, the engine and cars being much damaged, one passenger seriously and four slightly hurt.

On the afternoon of the 13th three cars of a passenger train on the Bennington & Rutland road were thrown from the track at South Wallingford, Vt., by a broken rail.

On the night of the 17th a freight train on the Chicago & Grand Trunk road struck a broken rail near Flint, Mich., and 16 cars were thrown from the track.

On the morning of the 18th a passenger train on the Nashua & Rochester road struck a broken rail at East Derry, N. H., and two cars were thrown from the track and over against the station building. The baggage car was wrecked, a passenger and four train-men hurt.

On the morning of the 23d a passenger train on the Charlotte, Columbia & Augusta road struck a broken rail near Lexington, S. C., and three cars were thrown from the track, upset and badly damaged, injuring the conductor and three passengers.

About noon on the 27th a passenger train on the Chicago, St. Paul, Minneapolis & Omaha road was thrown from the track by a broken rail near Wisconsin Valley Junction, Wis., and the engineer was slightly hurt.

On the 28th a passenger train on the Hannibal & St. Joseph road struck a broken rail near St. Joseph, Mo., and two cars were thrown from the track. They ran over a short bridge, but kept on the ties.

Very early on the morning of the 29th a freight train on the Chicago & Northwestern road was thrown from the track near Oakfield, Wis., by a broken rail, and 14 cars went into the ditch. The road was blocked nearly all day.

On the afternoon of the 30th a passenger train on the Rhinebeck & Connecticut road struck a broken rail near Rhinebeck, Conn., and was thrown from the track, two cars going down a high bank. The mail car caught fire and was partly burned up. Five train-men were hurt.

DERAILMENTS, BROKEN WHEEL.

On the morning of the 4th two cars of a passenger train on the Cleveland, Tuscarawas Valley & Wheeling road were thrown from the track at Barton, O., by a broken wheel. Both cars went down a bank; three train-men and two passengers were hurt.

On the 26th four cars of a freight train on the Louisville & Nashville road were thrown from the track near Ewell, Tenn., by a broken wheel.

DERAILMENTS, BROKEN AXLES.

On the afternoon of the 3d a passenger train on the Cleveland, Mt. Vernon & Delaware road was thrown from the track near Bangs Creek, O., by the breaking of an axle under the tender.

On the 6th several cars of a freight train on the Pennsylvania Railroad were thrown from the track at Butler Junction, Pa., by a broken axle.

On the 16th a passenger train on the Chicago, Rock Island & Pacific road was thrown from the track near Mokona, Ill., by a broken axle. Two cars left the track and a passenger was slightly hurt.

On the morning of the 17th three cars of a freight train on the Lake Shore & Michigan Southern road were thrown from the track on a bridge at Fremont, O., by a broken axle. Being on a bridge it was a pretty hard wreck to clear up.

On the night of the 17th two cars of a passenger train on the New York & Canada road were thrown from the track in a tunnel near Port Henry, N. Y., by a broken axle. The cars were badly damaged by knocking against the sides of the tunnel, and the baggageman and express agent were hurt.

On the night of the 27th a freight train on the New York, Pennsylvania & Ohio road was thrown from the track near Shenango, Pa., by a broken axle and several cars were wrecked.

On the 30th the engine of a passenger train on the European & North American road was thrown from the track near Winn, Me., by a broken axle under the tender.

DERAILMENT, BROKEN CONNECTING ROD.

On the night of the 29th the locomotive of a passenger train on the St. Paul, Minneapolis & Manitoba road broke a connecting rod in Fergus Falls, Minn., and the loose end caught in the ties, throwing the engine and several cars from the track, doing some damage and injuring three passengers slightly.

DERAILMENTS, BROKEN BRIDGE.

On the afternoon of the 22d a passenger train on the Carolina Central road broke through a trestle bridge at Indian Creek, N. C. The engine got across, but all the cars went down 55 feet into the ravine below, and were piled up in a bad wreck, which into a few minutes caught fire and was burned up. There were six persons killed (four being burned to death), the conductor and 18 passengers hurt. The bridge was overhauled not long ago and was thought safe.

On the night of the 22d a freight train on the Central Iowa road broke through the bridge over North Skunk, Ia., and 12 cars went down and were wrecked.

On the morning of the 28th a construction train on the Central Iowa broke through a bridge over Timber Creek, near Marshalltown, Ia., and sixteen cars went down into the river in a bad wreck, on top of the engine. The engineer, fireman and conductor were hurt.

DERAILMENTS, SPREADING OF RAILS.

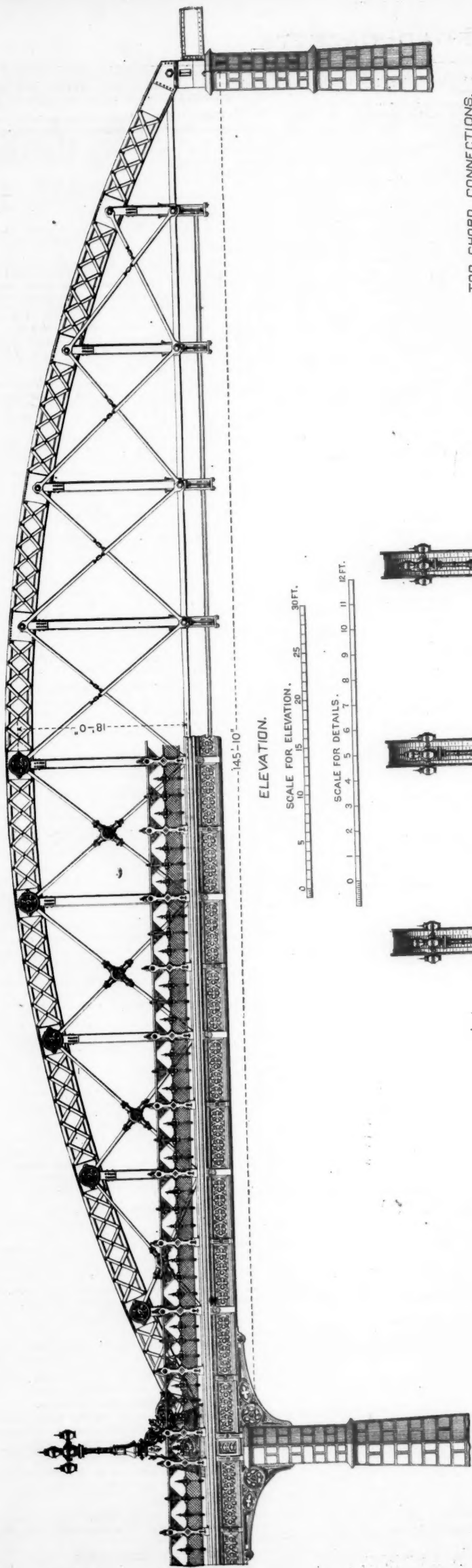
On the 8th a passenger train on the Stockton & Copperopolis Branch of the Central Pacific was thrown from the track near Trigo, Cal., by the spreading of the rails. A car was badly damaged, a brakeman and a passenger slightly hurt.

On the night of the 15th seven cars of a freight train on the Wabash, St. Louis & Pacific road were thrown from the track near Bement, Ill., by the spreading of the rails. It is said that a gang of section hands, who had been laying new rails, had left them insecurely fastened.

On the morning of the 30th a passenger train on the Wabash, St. Louis & Pacific road was thrown from the track near Council Bluffs, Ia., by the spreading of the rails. A dining car upset down a bank, injuring five employees slightly.

DERAILMENT, LAND-SLIDE.

On the night of the 6th the engine of a freight train on

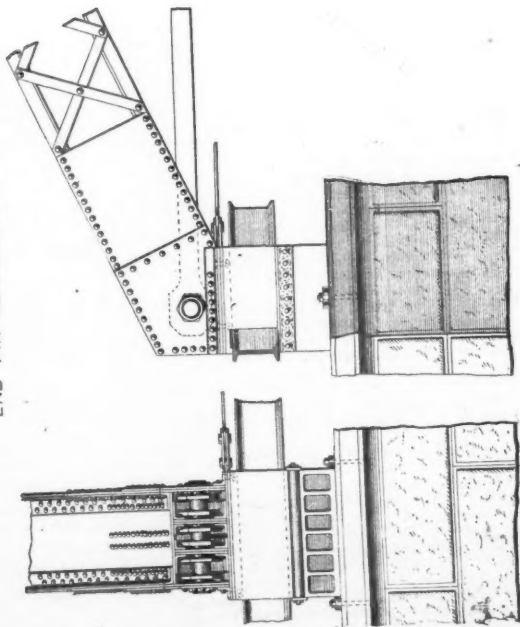


ELEVATION.

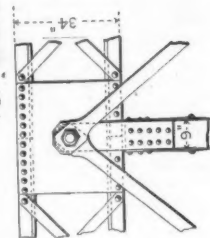
SCALE FOR ELEVATION.
0 5 10 15 20 25 30 FT.

SCALE FOR DETAILS.
0 1 2 3 4 5 6 7 8 9 10 11 12 FT.

END PIN CONNECTIONS.

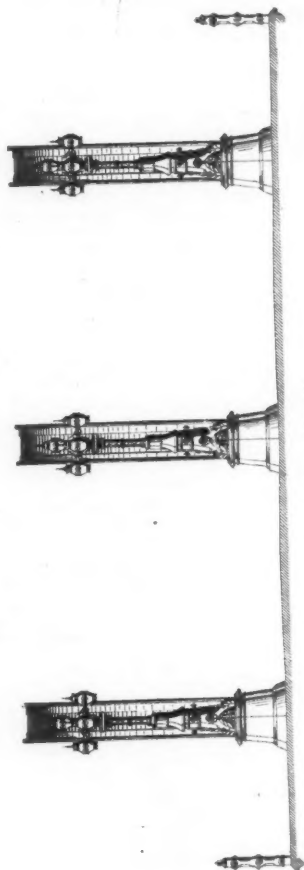
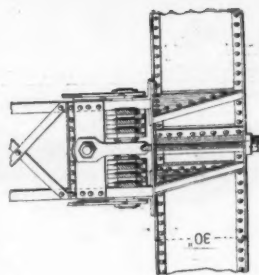
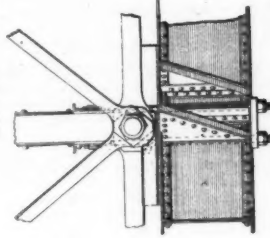


TOP CHORD CONNECTIONS.

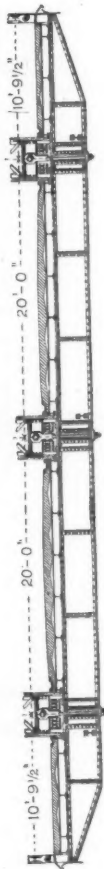


130'

BOTTOM CHORD CONNECTIONS.



END VIEW.



SECTION OF FLOOR.

— 145'-10" SPAN — CALVERT STREET BRIDGE.

— BALTIMORE, Md. —

1879

C. H. LATROBE, C. E.

the Lehigh Valley road was thrown from the track at Lehigh Gap, Pa., by a land-slide, and wrecked, killing two men who were on the engine.

DERAILMENTS, SNOW.

On the afternoon of the 9th a passenger train on the Chicago & Northwestern road was thrown from the track near Courtland, Minn., by snow or ice packed down upon the rails. Several cars were wrecked and the baggage car burned up.

On the morning of the 25th the engine of a passenger train on the Long Island road was thrown from the track in Hicksville, N. Y., by snow and ice packed down in a frog, and upset. The engineer and fireman were caught underneath the engine and badly hurt.

On the 29th the engine of a passenger train on the International & Great Northern road was thrown from the track in Palestine, Texas, by ice and snow which had gathered on the track—a very unusual case in Texas.

On the night of the 29th a passenger train on the New York Central & Hudson River road ran off the track in a snow-drift near Lancaster, N. Y., and was blocked all night.

On the afternoon of the 30th a freight train on the West Jersey road ran off the track near Glassboro, N. J., blocking the road several hours. The accident was caused by snow and ice packed down at a switch.

DERAILMENT, ACCIDENTAL OBSTRUCTION.

On the evening of the 7th a freight train on the Lake Shore & Michigan Southern road ran over a man at Thirty-fifth street in Chicago, and, one car of the train, which was backing up, was thrown from the track. A yard-man was thrown from the car and killed.

DERAILMENT, CATTLE.

On the evening of the 7th a passenger train on the Mobile & Ohio road struck a cow just as it was going on a trestle near Saltillo, Miss. The engine and two cars were thrown from the track and piled up in a bad wreck, tearing down about 50 feet of the trestle. The engineer jumped, but was caught under the engine and crushed to death; the fireman was hurt.

DERAILMENTS, MISPLACED SWITCH.

On the evening of the 2d a passenger train on the Central Railroad of New Jersey was thrown from the track in the yard at Long Branch, N. J., by a misplaced switch.

On the morning of the 6th a passenger train on the Ohio & Mississippi road was thrown from the track at Greendale, Ill., by a misplaced switch. A car was damaged, a passenger killed and another fatally hurt.

On the afternoon of the 7th a freight train on the Cincinnati Southern road was thrown from the track by a misplaced switch at Greenwood, Ky., and five cars were wrecked.

On the night of the 9th a freight train on the Grand Trunk road was thrown from the track by a misplaced switch at Listowell, Ont., and several cars were wrecked.

On the night of the 17th a coal train on the New York Central & Hudson River road ran over a misplaced switch into and through the engine-house at Fairport, N. Y., knocking down the wall of the house and falling down a steep bank behind it. Several coal cars were also wrecked, the fireman killed, the engineer and conductor hurt.

On the morning of the 18th a working train on the Indianapolis, Decatur & Springfield road was thrown from the track at North Salem, Ind., by a misplaced switch. The engineer, fireman and another man were hurt.

Very early on the morning of the 20th the engine and two cars of a passenger train on the New York, New Haven & Hartford road were thrown from the track by a misplaced switch in Bridgeport, Conn., blocking the road four hours.

On the morning of the 23d a passenger train on the Pittsburgh, Titusville & Buffalo road was thrown from the track at Miller Farm, Pa., by a misplaced switch.

On the night of the 23d a wild engine on the Junction road in Philadelphia was thrown from the track by a misplaced switch.

DERAILMENT WITH MALICIOUS INTENT.

Very early on the morning of the 19th a freight train on the Wisconsin Central road struck some rails which had been laid across the track near Plymouth, Wis., and the engine was thrown from the track. It is thought that the intention was to wreck the pay-car, which had passed over the road a short time before. A brakeman sent back with a signal was seized by masked men and robbed of what money he had with him.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

Very early on the morning of the 1st a freight train on the New York & Greenwood Lake road ran off the track at Arlington, N. J., doing some damage and blocking the road eight hours.

On the morning of the 1st two cars of a local passenger train on the New York Central & Hudson River road ran off the track at Lockport Junction, N. Y. One car upset and the other was thrown over against a freight train standing on a siding; both were badly broken and three passengers slightly hurt.

On the night of the 3d a freight train on the Pennsylvania Railroad ran off the track near Kittanning Point, Pa., and the engine went 40 feet down a bank, making it a very difficult job for the wreckers to get it up again.

On the morning of the 4th a passenger train on the Cape Fear & Yadkin Valley road ran off the track near Lower Little River, N. C., damaging several cars.

On the morning of the 5th six cars of a freight train on the Cincinnati, Indianapolis, St. Louis & Chicago road ran off the track in LaFayette, Ind., and were badly broken.

On the morning of the 6th a freight train on the St. Louis Division of the Louisville & Nashville road ran off the track near Henderson, Ky., doing a little damage.

On the morning of the 6th a freight train on the St. Louis Division of the Louisville & Nashville road ran off the track near Nashville, Tenn. Trains were delayed six hours.

On the 6th several cars of a freight train on the Wabash, St. Louis & Pacific road ran off the track near Cecil, O., blocking the road three hours.

On the night of the 6th a freight train on the Houston & Texas Central road was thrown from the track near Ross, Tex., and seven cars were wrecked.

On the night of the 6th a freight train on the St. Paul, Minneapolis & Manitoba road ran off the track near Crookston, Minn., doing some damage.

On the night of the 6th a freight train on the St. Paul, Minneapolis & Manitoba road ran off the track near Glyndon, Minn., damaging several cars.

On the night of the 6th a freight train on the Whitewater road ran off the track near Laurel, Ind. One car ran into the canal and several others upset and were damaged.

On the morning of the 7th a passenger train on the Pittsburgh & Lake Erie road ran off the track at Moravia, Pa., doing a little damage.

On the afternoon of the 8th some cars of a freight train on the Pittsburgh, Cincinnati & St. Louis road ran off the track in the yard in Indianapolis, Ind., blocking the track some time.

Early on the morning of the 9th the engine of a local pas-

senger train on the Pittsburgh, Ft. Wayne & Chicago road ran off the track near Alliance, O., delaying trains a short time.

On the night of the 10th a freight train on the Georgia Railroad was thrown from the track near Oconee, Ga., and the engine and six cars went into the ditch and were badly broken. The engineer and fireman were slightly hurt.

Early on the morning of the 11th a freight train on the New Haven & Northampton road ran off the track in New Haven, Conn., and two box cars were upset, causing some delay of trains.

On the night of the 13th two cars of a freight train on the Mobile & Montgomery road ran off the track near Bolling, Ala., blocking the road several hours.

On the afternoon of the 20th the engine of freight train on the Boston & Albany road ran off the track while backing into a siding at Indian Orchard, Mass. The road was blocked an hour.

On the morning of the 21st the engine of a freight train on the Southwest Pennsylvania Branch of the Pennsylvania Railroad ran off the track at Tarr's, Pa., blocking the road two hours.

On the night of the 22d the engine of a freight train on the New York, Lake Erie & Western road ran off the track in Port Jervis, N. Y., delaying trains a short time.

On the morning of the 27th a freight train on the Indianapolis & Vincennes road ran off the track near Spencer, Ind., blocking the road several hours.

On the night of the 27th the engine of a freight train on the Shenango & Allegheny road ran off the track near Fredonia, Pa., blocking the road several hours.

On the night of the 28th a passenger train on the Chicago, Milwaukee & St. Paul road ran off the track in Chicago, Ill., damaging several cars and injuring five passengers slightly.

Very early on the morning of the 31st a freight train on the Illinois Central road ran off the track near La Salle, Ill., wrecking the engine and several cars and injuring the engineer.

BOILER EXPLOSIONS.

On the morning of the 10th a yard engine on the Michigan Central road exploded its boiler while running slowly through the yard at Grand Rapids, Mich. The engine was wrecked, but no one was hurt.

On the night of the 23d a freight engine on the Philadelphia & Reading road was sent out from Palo Alto, Pa., to bring in a train of loaded coal cars from a siding some two miles up the road. An hour later the engine was found a mile beyond the siding with all the crew—engineer, conductor and two brakemen—dead and terribly mutilated. The boiler had exploded, tearing the engine to pieces and killing all the men. The engine was used for yard work, but was in good condition. As the explosion occurred in a very lonely place and all the men were killed, no details could be known, nor can it be explained why it should have gone a mile beyond its destination.

On the morning of the 30th the engine of a freight train on the Chicago & Alton road exploded its boiler when just entering Joliet, Ill., destroying the forward part of the engine and injuring a brakeman. The engineer and fireman were not hurt. It is said that the goose-neck pipe on the tender was frozen up, so that no water could pass to the pumps, and the water in the boiler thus became very low.

OTHER ACCIDENTS.

On the night of the 10th the baggage car of a passenger train on the Louisville, Cincinnati & Lexington road caught fire when near Lagrange, Ky., and was destroyed.

On the 14th the engine of a passenger train on the Amboy division of the Pennsylvania Railroad broke a parallel rod when near White Hill, N. J., damaging the engine and delaying the train some time.

On the morning of the 15th the engine of a passenger train on the New York, Lake Erie & Western road broke a parallel rod when near Hobokus, N. J. The engine was damaged, and the train delayed some time.

This is a total of 135 accidents, whereby 29 persons were killed and 141 injured. Thirteen accidents caused the death of one or more persons; 38 caused injury but not death, while in 84, or 62½ per cent. of the whole number, there was no injury to persons recorded. The proportion of fatal accidents is unusually small.

As compared with December, 1879, there is an increase of 66 accidents, of 11 in the number killed and of 69 in that injured—a sharp contrast.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:	
Rear collisions.....	37
Butting collisions.....	15
Crossing collisions.....	4
—56	

DERAILMENTS:	
Broken rail.....	14
Broken wheel.....	2
Broken axle.....	7
Broken connecting rod.....	1
Broken bridge.....	3
Spreading of rails.....	3
Land-slide.....	1
Snow and ice.....	5
Accidental obstruction.....	1
Cattle.....	1
Misplaced switch.....	1
Malicious obstruction.....	1
Unexplained.....	25
—73	

Boiler explosion.....	3
Broken connecting rod, not causing derailment.....	2
Car burned while running.....	1
Total.....	135

Nine collisions were caused by trains breaking in two; eight by misplaced switches; three by mistakes in or misunderstanding of orders; one each by fog and by a runaway train.

Of the three broken bridges one was an ordinary wooden trestle, the other two were wooden truss bridges; all are reported to have been in poor order, needing repairs.

There were 44 accidents resulting from defect or failure of road or equipment; seven caused by the elements or the weather; three by purely accidental causes, which could not be foreseen; 55 were due to carelessness or defective management; one was maliciously caused; and 25 were unexplained. Probably a number of the unexplained accidents should be charged to snow or ice.

There were 69 accidents given as taking place in daylight, 54 in darkness, and in 12 cases the time is not definitely given.

The great blot upon the record is the large number of misplaced switches. No less than nine derailments and eight collisions—seventeen accidents, or nearly one-eighth of the

whole number—resulted from this form of carelessness, which is a discredit both to the intelligence of train-men and the discipline of managers.

A division according to classes of trains is as follows:

Accidents:	Colli-	Derail-	Other	Total
To passenger trains.....	sions.	ments.	Accidents.	
3	35	3	41	
To a passenger and a freight.....	28	—	—	28
To freight trains.....	25	38	3	66
Total.....	56	73	6	135
Casualties:				
Killed by.....	12	13	4	29
Injured by.....	57	83	1	141
Total.....	69	96	5	170

The very large number of accidents is readily explained by the fact that the month was the severest December for many years—notable alike for its extreme cold and its heavy snows, while December of the preceding year was, for the season, a mild and pleasant month. Thus, in December last, there were nearly twice as many broken rails reported as in December, 1879, while the accidents resulting from failure of iron rails, axles, wheels, etc.—were 32 in number, against 15 the preceding year. The proportion of collisions was large, and a number of them are directly traceable to the crowding and confusion, which so often follows a snow blockade.

Master car-builders might profitably take note of the number of collisions which resulted from the giving way of couplings.

For the year ending with December the record is as follows:

	Number of accidents.	Killed.	Injured.
January.....	62	11	50
February.....	64	16	49
March.....	65	9	33
April.....	71	11	45
May.....	46	30	107
June.....	56	15	77
July.....	78	21	100
August.....	112	49	214
September.....	124	15	54
October.....	120	69	137
November.....	145	40	165
December.....	135	29	141
Totals.....	1,078	315	1,172
Total, same months, 1879.....	910	185	709
1878.....	740	204	756

The averages per day for the month were 4.35 accidents, 0.92 killed and 4.55 injured; for the year they were 2.85 accidents, 0.86 killed and 3.20 injured.

The average casualties per accident were, for the month, 0.215 killed and 1.043 injured; for the year, 0.292 killed and 1.087 injured. Thus the accidents for the month were somewhat below the average of the year in their injuries to persons.

Calvert Street Bridge in Baltimore.

The following description of this bridge, of which we publish details with this number, was furnished by the engineer:

The bridge, starting from the south end, consists first of one span across Jones' Falls of 116 ft. between pin centres, thence of 196 ft. of viaduct in spans of about 29 ft. across the valley; thence of one span of 145 ft. 10 in. across the railroad tracks, and thence of 115 ft. of viaduct reaching to the north abutment. The total length of the structure is 575 ft.; breadth over all, 62 ft. The spans are of the bow-string girder form, entirely of wrought-iron with the exception of the bed-plates and chairs. The arc is formed of plates and angles bent to the proper curve, and latticed, and is made continuous by riveted joint plates. The chord is of eye-bars. The posts, which are really tension members, are built of latticed channels, and being riveted firmly to the floor beams, assist in giving lateral stability to the arc at each panel point. The panel ties are flat eye-bars swiveled. The floor beams are plate girders. The 116 ft. span has a skew of 7° 50', and the 145 ft. 10 in. span has a skew of 32° 45' from a right angle. The two sections of viaduct are alike in character, consisting of plate girders resting on cast-iron columns, which are based upon and bolted to cut stone pedestals. The masonry is first-class coursed work of gneiss with granite string courses and coping. It consists of two hollow abutments, three piers and 43 pedestals. The floor is composed of rolled beams covered with buckled plates, upon which is laid the solid asphaltum roadway, the average thickness of asphalt being on the spans 5½ in., on the viaduct, 6½ in. The asphalt was put down in three layers, the first being a levelling layer to cover the buckled plates and tee bars, about 3 in. thick; then the second and final layers were put on, each being rolled in turn by a 5-ton steam roller. This floor after four months constant use is in very fine order. The solid asphaltum floor was adopted on account of its elasticity and capability of adjusting itself to the expansion and contraction of the iron-work; it is not continuous over the entire length of the structure, but is broken into four separate sections, one for each span and one for each viaduct. The ends of the arched ribs are covered with pedestal castings, surmounted by lamp pillars carrying-bronze lamps. The capacity of the structure is 100 lbs. per square foot of floor surface, in addition to its own weight. The total weight of the iron in the bridge is 2,500,000 lbs.; total amount of masonry, about 7,500 cubic yards. The ends of the abutment wings are surmounted by granite pedestals, upon which are to be placed the figures of lions, guarding shields carrying the city arms.

Everything has been done in the most substantial manner, and with a view to permanency. The total cost of the structure was \$219,000.

—Mr. W. J. Averell has tendered his resignation as President of the Ogdensburg & Lake Champlain Company. It has not yet been acted on by the board.

Contributions.

The Invention of the Link Motion.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the *Railroad Gazette* of Dec. 31, 1880, is a letter having reference to the invention of the link motion, in which it is stated that Robert Stephenson had said the inventor of the link was formerly a pattern-maker in his employ. Your editorial remarks added to that letter are in the main correct, but there are a few facts not mentioned, but connected with the invention, of which I happen to be somewhat conversant, and which I ask for your permission to place on record.

From November, 1844, to June, 1847, I was working in Stephenson's locomotive establishment, Newcastle, chiefly on the link motion, or what was there generally called the "hand gear," where I had many opportunities of learning particulars of the introduction of the link, then only recently adopted. Mr. Williams, the gentleman apprentice mentioned in your remarks, was then working on the pump bench, and Mr. Howe was one of the pattern-makers. With the latter I seldom had occasion to speak, but with Mr. Williams I became intimately acquainted, and from himself I learned the particulars of his claim as inventor of the link, the history of which was believed in by every leading man in the shops, and openly spoken of as a credited fact.

The history ran thus: The conception of the link occurred to Mr. Williams in 1842, when he made some rough sketches of his idea, and showed them to Howe, the pattern-maker, asking him, as a private business transaction, to make a model of the link. He left the sketches with Howe, and explained to him fully the object of the link, and what he wanted it to accomplish. Mr. Howe undertook the job, and, as it afterward appeared, was not long in making the model, but instead of showing it to Mr. Williams, he submitted it to Mr. Wm. Hutchinson, the manager of the works, who, seeing the advantages it possessed over the old "gab motion," sent the model to Mr. Stephenson, who at once gave his approval, with orders for its application to an engine.

One day, shortly after this, Mr. Williams was in the drawing office, and noticed a draughtsman busy with the new link motion, when, on making inquiry about it, he at once discovered the treachery that had been played upon him. He immediately went to the manager, and claimed that the link was his (Williams') own invention, and explained how it was he had engaged Howe to make the model. Remonstrance, however, had no effect. He then wrote to Mr. Stephenson, who, at that time, too busy himself to look into the matter, referred the whole subject to the manager, who subsequently succeeded in inducing Mr. Stephenson to believe that Howe was the inventor, in substantiation of which Mr. Williams' sketches were submitted to show that although the idea of the link was apparent, it was not practicable. The explanations and suggestions verbally given to Howe by Williams were carefully suppressed, and in this way his claim was disputed.

There is one piece of evidence, however, that stands out prominently in favor of Mr. Williams' claim, and that is, the well-known fact that neither Stephenson nor Howe ever got link patented, although it was understood that considerable efforts were made to do so; but the threatened resistance of Mr. Williams and his friends was sufficient to prevent that course, and the consequent result was that the link motion never was patented, but became general property at once, and was immediately adopted by all locomotive engine builders. The importance of the invention cannot be over-estimated, when we consider that, after a period of thirty-eight years, the link motion is in general use at this time, in all its original and exquisite simplicity, and is the most felicitous piece of mechanism ever applied to the locomotive.

That Mr. Howe made the original model of the link was admitted, but that he was its inventor was denied before its first application. With Mr. Williams' sketches before him, and the instructions given him for making the model, there was very little left for Mr. Howe to work out; but the little he did was undoubtedly well done, and credit to that extent is due to him. The part taken by Mr. Howe in claiming the link, and his acceptance of Mr. Stephenson's twenty guineas for it, made him an unenviable man among his fellow workmen; and, being of a saturnine disposition, when he left us to go to the Claycross colliery there was no regret at his departure.

The amiable disposition of Mr. Williams made him beloved by all who knew him intimately. He was known to be well conversant with the steam engine, and had just such qualifications and originality of mind that would lead to investigations for the improvement of his profession.

I desire here to disclaim any personal prejudice in writing this letter—which would not have been written had I not seen the letter and remarks alluded to in your paper—but my personal recollections of the parties concerned and the circumstances surrounding the invention of the link, as represented openly at the early date mentioned, has induced me to place on record what I believe to be facts, desiring only that honor be given to him to whom honor is due. I will merely add that Mr. Williams has been dead many years, and up to the last of his life he maintained his claim as inventor of the link motion.

JOHN ORTON.

ST. THOMAS, Ont., Jan. 29, 1881.

Better Coupling Pins Wanted.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Years ago accidents from broken car couplings were rare as compared to the frequent disasters of late from that cause. One reason for this lies in the fact that formerly much lighter trains were hauled than is the rule at present.

Another is that better material was used in the construction of coupling pins, and they were manufactured under a different process. Formerly when a pin failed it was due to a flaw in material that was otherwise of good quality, whereas the breakages of the present day are largely chargeable to inferior material, and not wholly due to the heavier trains hauled. The size of the pins now in use should, if made of good iron, be such as to make them strong enough to hold the heaviest trains running. The tracks on some of our roads are literally strewn with broken pins, and it is hardly possible to find one among them that is made of good material. Among several hundred broken pins examined by the writer, none gave evidence of having been made of good iron. On the contrary, the points of fracture gave conclusive evidence of an inferior article. But few were bent before breaking, and they were coarse and granulated, breaking short, as in the annexed figures. The fracture of the greater number was in the form represented in fig. 1, and while none of them exhibited any signs of toughness, a few broke in the forms represented in figs. 2 and 3. A few were slightly bent, but in almost every instance no bending was perceptible. Most of the pins examined were round, but a few flat ones were met with, shown in section in fig. 4. These flat pins were invariably bent before breaking, and the fractures exhibited a far better material than could be found in the round ones, although not

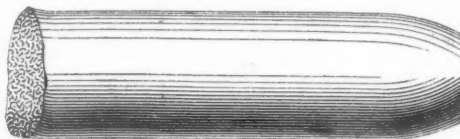


FIG. 1.

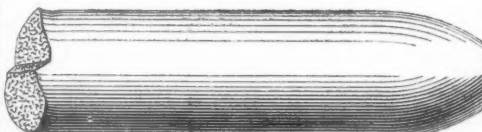


FIG. 2.

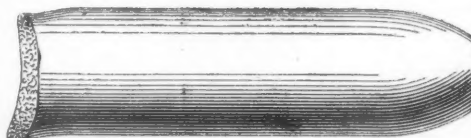


FIG. 3.

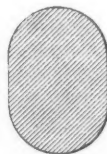


FIG. 4.

quite the thing for the purpose. This matter of poor iron in coupling pins needs investigation. In October eleven collisions are reported from trains breaking in two, all of which caused more or less damage, and some of the collisions were of a serious nature, and it is very probable that many cases occurred that were not reported. It is the practice on some roads to tax powerful locomotives to their last pound "and then put on another car." This may be regarded as straining the truth about as hard as the locomotive, but that is the way a runner expressed it the other day, and he was not very far from the truth—say about one car.

These monsters get stalled, and it requires many "yanks" to get them over the hill and many pins are broken in the effort, to say nothing of the damage to the other drawing tackle. "What becomes of all the pins" (coupling) is no longer a mystery, and it is advisable to run lighter trains or get better pins, but get better pins any way.

WM. S. HUNTINGTON.

Uniformity in Signals.

TO THE EDITOR OF THE RAILROAD GAZETTE:

While there have been efforts made by various railroad companies to agree upon standard cars, standard heights of draw-heads, sizes of axles, etc., it does not appear that there has been much if any effort made to fix upon a standard system of signals. I refer now more particularly to whistle, lamp and flag signals. This important subject does not seem to have received the attention it deserves.

Each manager or superintendent has established his own system, according to his own ideas, without regard to his neighbors.

The result is that we find a great want of uniformity in signals on connecting roads. This operates to a disadvantage at railroad crossings, junctions, and especially where two railroads use the same piece of track for a long or short distance.

Take, for instance, the matter of lamp signals. We will assume that the A. & B. R. R. and the C. & D. R. R. use the same track for a distance of say 25 miles, or rather that the trains of the A. & B. run over the C. & D. road for that

distance. The signals of these roads are not uniform. An engineman starting out on the A. & B. road receives from the different flagmen along the line a light swung in a circle. This is the safety signal, and he knows that the track is clear. By and by he switches off on the C. & D. road, and there is a change. The flagman now moves his light up and down, which is the signal that the track is clear, and the light swung in a circle now means to back the train, instead of "line clear" as before. The same remarks will apply to the whistle and bell signals.

We occasionally see this rule on a time table, "One tap of the engine signal bell, when the train is running, is a signal to stop at once." Now, if the train breaks in two, as it occasionally does, the straining of the bell-cord causes the bell to ring, and if the engineer stops at once, as he is required by rule, the probability is that the rear portion of the train will run into the forward section, unless great care is exercised. This will apply only on roads where the Westinghouse automatic brake is not used.

Red has been fixed upon as the danger signal almost universally, and should be used as little as possible, and only in case of danger; yet we frequently see red signals carried on an engine to denote that another train is following, and, in the majority of cases, a section man will display a red signal when he wishes to caution a train to run slow.

It is the excessive use of the red signal that impairs its usefulness.

Again, green is very generally a cautionary signal; but why it should be used on switch-stands or targets to show that the switch is set for the main line is more than the writer can say.

In glancing over the subject, it has occurred to the writer that the following are some of the points that should not be overlooked in adopting a system of signals: The signals made with the lamps should be simple, and not liable to be mistaken; the employees required to make the signals should be drilled in the use of the same, and followed up to see that they are correctly made. This work could be put under the supervision of an inspector, whose other duties might include the inspection of station buildings and grounds, lamps and flags, looking after reckless running, especially of freight trains, etc. This would require the services of a trained and experienced railroad man, but would doubtless pay in the end.

The writer remembers an instance on a new road, where a number of flagmen were engaged. They were all said to be railroad men, and had letters of recommendation from judges, politicians and various other gentlemen of standing in society.

The rules and regulations of the road were simple and explicit, yet when these men were put to work, hardly any two of them made the same signal in the same way, and a great deal of time was consumed in beating into their heads that swinging a lamp in a circle was not waving across the track, and raising and lowering a light vertically was not a circle. This was an exceptional case, however, and it was not probable that there are many switchmen and flagmen who are not able to comprehend the rules under which they work.

The whistle signals should be made short and distinct, and the nuisance of continual "tooting," especially at road crossings, should be abated as far as possible.

Although lights on switch stands seem to be of great importance, I venture to say that there are comparatively few roads where all the switches in the main track are provided with lights. The damage caused by a misplaced switch at night might more than cover the cost of providing all the switches with lights, to say nothing of the possible loss of life. Since the introduction of the point switch it has become very important that a good day signal should also be placed at all facing points, as it is an absolute impossibility for the engineman to know that the switch is right until he is within a very short distance of it.

Of course the writer is well aware that it is a very easy matter to criticize and find fault, and quite another thing to suggest a remedy. The object of these remarks has been to point out a few of what seemed to be bad features in the various signal codes, and to suggest that the details of the matter should be looked into and studied, and a simple and systematic code of signals adopted.

HOOSIER.

The Inspection of Rails.

[From a paper to the American Institute of Mining Engineers, by C. P. Sandberg, C. E., read at the Lake Superior meeting, August, 1880.]

It is beyond doubt that the inspection of rails is a matter of great importance. Whether it is necessary or not was at one time a debated question, but it has long ago been decided in the affirmative. In fact, in Europe most all the rails are inspected, partly with a view to economical advantage to the railway, but principally with the intention of securing safety to the traveling public. In these times, when the material used and the mode of manufacture are so materially altered from what they were a few years ago, it behooves the railway companies to do all they possibly can to insure public safety as well as to promote economy, and I believe I am right in saying that these objects may be attained by the aid of competent supervision of the manufacture, so that it may be seen that the requirements of the specification are fulfilled in its execution. On the other hand, an inefficient inspection is worse than none at all, because the fact of there being an inspection relieves makers from a responsibility which might otherwise be felt. Then the question arises: What is a good inspection? And the reply is: A competent, independent and strict supervision of the daily make, testing the quality as well as passing the rails, and finally stamping and approving, by certificate, before the rail leaves the works and is paid for. Unfortunately the requisite experience is not so easily obtained as railway presidents are apt to believe—a fact which is shown by their sometimes sending as inspectors such men as a draughtsman, or a captain of the army, who may never have seen iron manufactured or rails rolled, and who has to learn his business at the expense of the maker and

his employers. As a necessary consequence, the object in view is not obtained. An inspector should be as much at home in the rail manufactory as the maker himself, from the beginning to the end of the processes; and, having the necessary moral power inspired by his knowledge, he should cause no unnecessary expense with his tests, but by adherence to the stipulations of the specifications, secure a good rail of correct exterior and of sound inherent qualities. If the inspector has not been brought up in the iron manufactory with the necessary metallurgical and chemical knowledge, makers are only too prone to take advantage of his ignorance. This was more frequently the case in earlier days, when special delight was taken in deceiving the inspectors, particularly by the gaffers and workmen. I could give many instances from my twenty years' experience, amusing enough, illustrative of this. I am glad to say that now, at any rate, with my staff of inspectors, who are well known in all the European rail-making districts, such practices are seldom or never attempted. A maker naturally regards a stranger who comes to inspect one order only very differently from one whom he has seen more or less frequently, and whom he may soon have to meet again. It is certainly more easy to work under a constant system of inspection employed by a regular inspector, however strict it may be, than to submit to the changes demanded by different inspectors. Inasmuch as the mode of manufacture differs in each district, no general specification when laid out in great detail can be applicable in all of them. The differences in ore, in material, and in local circumstances, as well as in the machinery employed, make such detailed specifications impossible to be followed; and it is with this difficulty in view that I have limited my own specification to general terms in prescribing the mode of manufacture. If the specification were detailed, railway companies would not obtain any competition, but would have tenders from only a few works which would be able to fulfil the conditions of the specification sent out. Unfortunately we have not found a method to test every rail for quality, and until we do, this inspection can only be partial. A suggestion was made some years ago to apply a registered manometer to the punching machine, and thus to measure the hardness of the steel; but the idea was still-born, leaving us as before to the necessity of testing single bars. All that the inspector can do is to try to ascertain whether the bulk of the rails be quite equal to the samples tested.

However, as the quality of material may vary considerably, seeing that it depends on so many causes, it follows clearly that inspection is no absolute guarantee for obtaining safety and economy in each rail. All we may reasonably expect is that the general results of good inspection should amply repay the small outlay incurred for it; and the railway company has a certain satisfaction in being able to show to the shareholders as well as to the general public that all the practical means at its disposal for securing a good article have been employed. No one, however, can go so far as to hold the inspector legally responsible for any accident through broken rails, or failure of any other part of the work he has inspected, as he can only certify that the specification has been carried out, and that he has done his best to secure a sound and reliable article. In order to put the inspector on an independent footing, not only with the makers, but also with the agents or all intermediaries, his work should be paid by the railway authorities direct, and by no one else; and he should also have to send his reports and certificates direct to them. The inspection, whether mechanical or chemical, should be carried out at the works, and should be final. Makers have a right to demand this, and railway companies will have to obtain efficient inspectors by employing professional men, if they have none already in their service. To approve of the rails provisionally at the works, and to repeat the tests and inspection on the arrival of the rails at their destination, and then, if the two do not agree, to reject the rails, is certainly unfair; but, nevertheless, I am sorry to say that such is done by the stipulations made in some parts of Europe, notably in Germany and Russia. Rails tested in England for Russia during a mild season do not give the same results when exposed to similar tests in Russia under a low temperature; and loss to the maker or contractor follows, which is obviously unfair. This might have led to the stipulation in one of the German rail specifications, which caused much amusement in England a year ago, namely, that the rails should only be manufactured in the summer. Other German specifications stipulate that sample pieces from each blow in the converter should be taken and forwarded to the railway authorities, who would test them for tensile strength, and reject the rails made from that blow if the sample should not come up to the required strength and contraction of area. Meanwhile the rails would have been made, provisionally approved of by the inspector, and sent away. The maker would be left in an awkward position with a large production, say of 2,000 tons per week, if he had to stock his ingots, waiting for the results of the samples tested by the railway authorities. It seems now that the specification for rails, since the introduction of the use of steel, is becoming almost overdone—in America chemically, with the stipulation of only one certain chemical composition in the rails; and in Germany physically, in laying too much stress on contraction of area in fracturing samples to test tensile strength. For my part I do not hesitate to express my opinion that both systems are unpractical, as being not only costly but almost impossible to fulfil; nor even if carried out would it be in the end of any real use. It is true that the quality of iron rails deteriorated year after year, and it is no doubt through the fear that steel rails will also degenerate that these means have been resorted to. When the Bessemer process first was used for the manufacture of steel rails, only the very best and purest raw material could be used, such as contained neither sulphur nor phosphorus; but since then almost all sorts go into the pot and even phosphor-steel is now used for rails. But so far there is no proof of deterioration of the quality, although steel rails can now be got for one-third of the former price. It is natural, therefore, that a nervous feeling should seize the railway world to keep up the quality by specifying most stringent tests, both mechanical, physical, and chemical. I fear that after all they will be of little use. I have executed all three tests at great inconvenience, labor, and cost, and I have come to the conclusion that the simple falling test is all that is necessary, and is in every respect sufficient. It is readily made at the works as soon as the rails are cold, and if it follows up the make of rails, it is a self-controlling agency, which prevents the rejection of large quantities, as it tends to stop the manufacture of inferior steel. I shall, therefore, take the liberty of stating my mode of inspection as followed by my staff of inspectors—a method which has given entire satisfaction both to producers and consumers. The inspection should closely follow the make, so that should anything objectionable arise the maker may be caused to alter it at once, rather than to produce any large quantity of rails which would be rejected, either because they do not come up to the test or for other faults.

Sandberg's System of Inspection.—My plan is as follows: The specification for either iron or steel rails is put into an inspection book, which my assistant has to keep as a record of the daily work, both as regards rejected and accepted rails.

The specification is inserted in the inspection book, which the inspector strictly follows. Before the roll-

ing commences the template is approved, the length to which the rails should be cut measured exactly with my standard steel rule, and gauges are checked and stamped, such as the female gauge for sections, others for punching or drilling the bolt holes in the rail ends and for the notch holes in the flanges. As soon as the first bars come out they are weighed, and as the specification generally stipulates that they should be rolled to a certain weight, ten bars are weighed to see what the weight according to the section actually is; and then the rolls are screwed up or down to give the required weight, which will have to be observed, with the usual allowance of 2 per cent. on single rails and 1 per cent. on the whole order. Crop-ends are, as soon as they get cold, immediately tested with the falling weight, and if not strong enough the material is altered so as to sustain the test properly. The control of the manufacture chiefly implies the approval of a correct section in rolling, particularly as to the perfect fit of the fish-plates. The inspection of the rails commences as soon as there are any ready, straightened, punched, or drilled, first by measuring the length, then by determining whether they are straight, afterward by examining the exterior correctness, the clean surface, the freedom from cracks, or other imperfections; next by measuring the bolt holes and notches by the gauges; and finally by stamping (with the crown and assistant's initials) in the end of the rail. Afterward comes the reckoning by number of the different lengths, and entering the accepted rails at the right-hand side of the inspection book. All the rejected rails are entered on the other side, in the columns arranged for them (for bad ends, being too long, too short, crooked, twisted, or badly punched, and those rejected for exterior faults, cracks, etc.). The rails so rejected, with the exception of the radically bad ones, are taken out to be altered, and may then come again before the inspector. After each day's work an inspection report is sent to the head office, and for every 1,000 tons inspected the inspection book is also sent; this is copied at the head office and the copy is handed to the railway company or other employers, so as to acquaint them with the system and progress of the inspection, as well as with the results obtained in each individual order. The original book, as well as all daily reports and all documents belonging to the order, are kept together at the office. Weekly and sometimes daily reports are issued from the head office to the employers, to inform them of the progress of the manufacture and inspection, and when the rails are shipped a certificate of inspection is issued against the copy of the bill of lading. No duplicate certificates are ever issued. When the order is complete the results of the inspection as to rejection, etc., are entered in a book at the head office, and at the end of the year all the orders are tabulated and conclusions drawn from comparison of results. By the aid of this I am able to form my opinion for consultation on the merit and value of each maker's production, and as this opinion is based on actual work inspected on the same system it ought to be thoroughly trustworthy. From time to time I personally visit the rail-making districts for the purpose of inspecting the work, especially when starting new orders and whenever any difficulty arises or any difference has to be settled. By the inspection carried out in this way security is given to the purchaser (so far as security can be obtained) that the specification has been followed. To the maker it is also an assistance rather than a burden or hindrance, for it aids him in the supervision and control of his daily manufacture. It avoids the loss in the rejection of large quantities, perhaps hundreds or even thousands of tons, as the system of inspection discovers the defect immediately. I think if the makers had the option of choosing between inspection during or after manufacture, they would surely prefer the former plan. I am pleased to say that I have but seldom been obliged to reject any large quantities, but I have often been obliged to ask the makers to alter the quality of the steel when that which was being used did not come up to the specified standard, and they have always been willing to make the change rather than run the risk of turning out rails of doubtful quality.

Tests for Iron and Steel Rails.—As for the tests applied, I have three in my specifications for iron and steel rails, namely, one for stiffness and dead-load; the second for quality and for wearing capacity; and the third, falling-tests for safety against breakage. Now the description of my standard section will show that I have laid down a rule to apply these tests according to the weight of the rail. For iron rails the weight of ball in hundredweights must be multiplied by the height of fall in feet to equal the weight of rail in pounds per yard. For instance, for an iron rail 56 lbs. per yard, I prescribe a 7 hundredweight ball falling 8 ft. on the rail supported on bearings 3 ft. apart. I have always found this test sufficient, even for countries with cold climates, such as Scandinavia, Canada and Russia. The effect of the blow should be a deflection of $\frac{1}{4}$ in. to 1 in., and if that is not the result there must be some fundamental fault. The fall must then be increased so as to give the deflection in one blow. For safety tests it is of great importance to ascertain that all rails are equal in strength, and as it would be unnecessary waste to try good rails my practice has generally been to test every morning three crop-ends from the day and three from the night turn, and if these crop ends stand the test (and they usually give double the deflection of long rails) I may be quite sure that the rails also will stand the test. Should, however, the crop-ends not stand, the maker is immediately advised of the fact in order that he may alter his iron; and the rails are then tested as per specification, taking out one from every hundred, and, in the event of its breaking, dividing the bulk into 10 parts and testing again, so as to reject 10 for every bar that breaks. This plan is the only practical one: but still it does not prevent the occasional acceptance of a few brittle rails, and this cannot be overcome until we find a suitable method for testing each rail separately. The quality or wearing capacity of iron rails is tested by breaking crop-ends and rails under the press in order to ascertain that the welding is perfect; this is best determined by breaking the flange first, in which case the slab would separate from the rail-head if it were not properly welded. Bad or good results in this respect are entered in the columns set apart for that purpose in the inspection book, and an opinion may finally be formed whether the quality is one which can fairly be accepted. The dead-load tests are then executed, but as the stiffness chiefly depends on the section and height of rail, there is not so much variation in the result as with the other tests. However, as a guide to what the rails ought to stand, I have tabulated the results in the description of the standard rail sections. As iron rails (except for exportation to America) are considered in Europe as a thing of the past, this is of less practical interest than the subject of steel rails. But I am sorry to say that we are yet far from being unanimous as to the best system of inspecting steel rails, and I may give here the final paragraph from a report by a government engineer on this subject, where he says: "A diversity of opinion among men so experienced as yourself and the eminent authorities above named, leads to the conclusion that engineers, like doctors, often honestly differ upon the best means of obtaining similar results." I will, however, state the manner adopted by myself for the inspection of steel rails, which, as far as my experience goes, has hitherto given equally good results with those followed in inspecting iron rails. I have carried out the inspection of steel rails principally in the same way as that of iron, but with

very much more severe tests. The question has arisen why steel rails should be expected to sustain more stringent tests than iron, and the question has been argued from both sides. It seems that in order to make up for the variable hardness of the steel rails a more severe test is needed to secure a soft metal for rails. Where would engineers be if steel rails were tested with no heavier falling test than that used for iron rails? The makers would produce a much harder rail, because the hard metal rolls more easily, is more easily blown and with less waste, but then the breakages would surely be much more numerous than they now are. The superiority in the wearing qualities of steel over iron rails is no doubt due principally to the solidity of a material not apt to laminate, like the iron rail made from a pile. But it is doubted which is the more durable, the hard or the soft rail. For my part I agree with Professor Tanner that a rail of medium hardness, possessing the greatest absolute strength, is the best. Be this as it may, the safety of the rail is the main point, and the simplest way of securing this is by the test of a heavy falling weight. I have, for instance, adopted four to five times the blow for steel as for iron: a ton weight falling 20 ft. for a heavy rail, say 60 lbs. and above; and 15 ft. for a 56 lb. rail. A deflection of 3 or 4 in. should result from this, according to the hardness of the steel. Now I have not thought it necessary nor expedient to stipulate as to the mode of manufacture, either in Bessemer, Siemens, or even the Thomas steel, so long as the result obtained by the testing shows strength as above, solid fracture, and exterior correctness. Nothing more need be expected. But a practical test of very great value which my inspectors have to superintend each day during the make is that in which the maker himself, for his own satisfaction, tests every blow mechanically by having a sample ingot hammered out to a bar 1 in. by $\frac{1}{2}$ in., which should when cold stand bending at least to right angles. One end of this bar should be nicked and dipped into water and broken to expose the fracture, and the corresponding blow of the Bessemer has in each case to be approved by the foreman of the works before the ingots are taken to the rail mill. Should the steel break, the cast must not be used, and the blowing metal must be changed immediately so as to produce a superior material. In this case a chemical analysis—for carbon, silicon and phosphorus—is made in order to discover the cause of the metal being too hard or too brittle. This self-control of the maker is of greater value than any testing which could be made of the rails afterward; and I am pleased to say that the plan is instituted at almost every steel works in Europe. Formerly more stress was laid upon the chemical test for carbon, and every cast was analyzed for carbon by the coloration test of Eggertz. This is now, however, less insisted on, since it is known that other hardening substances besides carbon may equally affect the strength. Neglect to use the mechanical test on every cast may result in the production of large quantities of ingots which, when rolled out into rails, will not stand the tests inflicted, and I have quite lately had the very unpleasant duty of rejecting three or four hundred tons of rail which had been produced from a too silicious pig iron, the steel containing $\frac{1}{2}$ per cent. of silicon, and breaking at much lower tests than ought to have been the case. The production of good steel of uniform quality by the basic process of Thomas and Gilchrist entirely depends upon the mechanical tests.

Results of Inspection.—I may mention that the result of my inspection of steel rails during the past ten years on the system above described, taking the average of more than twelve works in England, is that the preliminary rejection at the first inspection has been 13 per cent. More than half the rails were rejected for not being straight, and the remainder for faults detailed in the inspection book. Of course after being re-straightened, re-cut, etc., all these rails would probably be accepted, so that the final amount rejected would only be from 1 per cent. to 2 per cent. This of course has nothing to do with that portion which the makers themselves reject before the rails are put upon the inspection benches; this may be taken as about equal to the other, so that the total amount ordinarily rejected in the manufacture may be estimated to be about 3 per cent. I do not mention the names of any makers, but I may say that I have had to inspect work at almost every rail mill in England, and, having kept my books carefully, I take the average of the work of English railmakers in general. Regarding the straightening of steel rails, I believe it to be a very important question. The present method is the same as that used for iron rails, and this is the cause of nearly all the breakages of steel rails when they get on the road. For the strength is liable to be spoiled by the rough treatment in bending the rail under the press with the hammer gags cut on the flanges; in fact, steel will not stand so much rough usage in this way as iron. Therefore straightening hot must be introduced sooner or later. Last autumn I drew public attention to this in an article which appeared in *Engineering* of 10th October, 1879, but I have to add that the method which I was then hopeful would answer has not proved itself quite as efficient as I expected. I allude to the curving or bending machine. It certainly does take out all twists, but it does not lessen the straightener's labor as much as I anticipated.

Having thus described my method of inspection, both of iron and of steel rails, I think you will no doubt have seen that there is no mystery or secrecy about it, or in fact anything extraordinary in the whole method. There is simply a good supervision of the make from beginning to end, and constant attendance during the manufacture of honest, practical, experienced men. All observations are recorded, and conclusions drawn from them.

Even if a railway company kept a competent man who would do the same, it follows that his practice would be limited; and, therefore, an engineer making a specialty of the business of inspection, and doing nothing else but inspect for various employers and in different districts, must naturally gain ten times more experience than any one would be able to obtain from practice supplied by a single company, which, unless it were a very large one indeed, could hardly find sufficient work to keep him constantly employed. It is then more to the interest, at any rate of smaller companies, to employ a professional inspector.

English Engineers' Specifications.—I will now give a few particulars of English engineers' rail specifications and of their mode of inspection, and afterward some of those adopted on the Continent. The English engineers, both for English and Colonial roads, prescribe very much harder conditions in their specifications than I have thought necessary to fix in mine; yet I very much doubt whether they get a better result. For instance, they stipulate that the pig iron should be cold-blast, mixed with Swedish, Spanish and Cumberland hematite, or other suitable cold-blast pig, with a proper quantity of best Rhenish spiegel, and not less than 10 per cent. charcoal pig re-melted in air furnaces, not in cupolas, ingots hammered not bloomed, and then tested with very heavy falling test. For instance, rails should be bent to right angles by blows without breaking (which means that for 56 lbs. rail three or four blows from a ton ball falling 30 ft. are required). Finally the rails have to be chemically analyzed at the direction of the engineer by a professional analyst, to whom the maker has to pay £5 5s. for each analysis made. Then follows, in one of them, this sentence: "The rails after they have been drilled and while warm are to be dipped in hot-boiled linseed oil before they have been

exposed to the weather, as a protection from the effect of the sea-water, etc., and afterward they must be sanded so as to effectually prevent their slipping in the ships on the voyage to their destination.

These and many other like stipulations simply mean an enhanced price from which the railway company derives no corresponding advantage. There are many points in the system of railmaking and inspection in England, insisted upon by English engineers, which might well be recorded, but as in my practice I have not had to deal with them, I may pass on to a short review of the leading feature of the Continental system.

German Engineers' Specifications.—Taking the largest district, that in Rhenish Prussia, there are about half a score of makers with about 10,000 tons weekly output, who formerly made rails only for Germany and the Continent, but who now have commenced exportation to America, because they produce twice as much as is required for home consumption. The German engineers have really gone to the extreme in specifying tests, to which no makers in other countries would submit. I give in *extenso* three specimens of modern German specification in the appendix,* such as is suggested by the Minister of Public Works, which therefore carries great weight, since the government bought some of the principal lines, such as the Berlin, Cologne-Minden, and similar important railways. In fact, Bismarck has laid his hand upon nearly all the main lines in the country for political reasons.

From the specification given it will be seen that over and above the ordinary tests there is particular stress laid upon the contraction of area, say 35 per cent., and absolute strength, 80,000 lbs. per square inch, with 20 per cent. elongation. Inspection is more stringent, rejecting for the slightest crack, and even after this inspection at the works, which causes great hindrance in the manufacture, the rails on arriving at their destination are still liable to be rejected on the second inspection. In the case of acceptance of tender a deposit of 5 per cent. is required for 10, and sometimes 12 years from the maker as a guarantee, but it is simply kept as caution-money. I need scarcely say that for such home orders a higher price is paid, on account of these stipulations and the trouble and annoyance they entail, for which the railway company certainly does not reap a corresponding advantage. I may, in conclusion, say that in my opinion the German engineers have gone much too far in the stipulation for physical tests. They lay all the stress upon contraction of area, which, may, I admit, indicate a soft material, but which test costs a great deal to make, and, what is still worse, delays the whole of the manufacture, keeping the maker in a state of constant suspense, or, to speak figuratively, on his bare knees before the directors of the railway, humbly awaiting the result of the final test, which they themselves institute after the rails have left his works and have already been passed by their own inspector.

As the German makers enter into competition with the English in the exportation of rails to America, I have during the last two or three years had to make inspections for American railroads in nearly all the German works, and I may state that the makers are fully competent to do justice under any ordinary conditions. They have been so much bothered, hampered and cramped with the extraordinary stipulations of their own railways, that they are pleased to work to a simple specification from abroad, and they much appreciate the relief it affords. The inspection results are good. Straightening is the principal cause of rejection there as in England.

Other Continental Engineers' Specifications.—Belgium has only two works laid out for steel-making, and France only one—the Creusot Works—which competes for foreign orders. I have inspected rails at the latter works, with entire satisfaction, for Scandinavia. It may be here remarked that the specifications for railways in Spain, Italy and France prescribe a less falling test than other countries in Europe, chiefly on account of the milder climate which there prevails. Russia, however, as the breakage of rails is a source of much trouble to her, has introduced into the specification a falling test under artificial cold, so that the test at the works where the rails are made may agree better with that afterward made in Russia. The Minister of Railways has lately read a paper before the Iron and Steel Institute, in which are given results of experiments in this direction. A piece of rail is imbedded in a mixture of salt and ice which produces a temperature of minus 20° Fahrenheit; after being cooled down in this mixture the rail has to sustain the ordinary falling test prescribed for steel rails. This seems to be a rather complicated and costly method, besides being slow, and would not therefore suit makers who wish to make their own tests during production, as described above. If, instead of the artificial cold, the falling test had been increased in a degree corresponding with the loss of strength due to cold, the same result would have been obtained with fewer drawbacks in the operation. It is to be hoped that after satisfactory relationship between the loss of strength and the lowering of temperature has been ascertained, the ordinary falling test may be used without salt and ice, but simply be regulated according to the temperature prevailing at the time of testing. My own experiments, made nine or ten years ago, on the influence of cold show that at low temperatures the diminution of strength is considerable,† and the same also appears in the paper read before the Institution of Civil Engineers by Webster.‡ We may conclude that there is certainly wanted a more severe falling test for safety in rails constructed for cold climates than for those intended for mild ones, but we have not yet sufficient data to determine exactly the relationship between test and temperature.

American Engineers' Specifications.—This finishes the broad outline of my remarks on rail inspection in Europe, and I would like now to touch upon the same subject as treated in America. About a year ago my friend Mr. Holley presented me with a copy of Dr. Dudley's work on the chemical constitution, composition and physical properties of steel rails,§ and he asked me to take up the matter in Europe. I accepted the task with great pleasure, and I circulated a large number of copies of the book among the engineers and most eminent authorities in Europe, writing a letter with each, asking an opinion on the book after perusal, as it contained new views upon steel-rail manufacture. I received many replies from all sides, some of which I give in the appendix. I also wrote to the learned Doctor himself, asking for further information on the subject, and received a reply saying that he was continuing his researches, the result of which would be laid before the Institute. This year I have had to inspect rails made under Dr. Dudley's specification, and it so happened that Mr. Holley was then in the district. They were made in Germany: the quantity was 2,500 tons, which sufficiently, I think, entitles me to advance an opinion. I need not repeat what has been already said in the excellent discussion which took place at your Institute, which I regard as being one of the most able and instructive discussions held for many years. It was only

after great consideration that both the makers and myself would undertake the execution of the specification. The small amount of silicon seemed to be the point of difficulty; however, by making the pig iron so as to start with only 1½ per cent. of silicon we brought it to its specified quantity of 0.04 or less in the rail, and we worked to all the other conditions closely. The results were, in rolling, more wasters and a larger quantity of rejections through the metal being less fluid than usual, the ingots were not so solid, and the rail-ends showed honeycombs and blisters. For these reasons I believe that rails made with this chemical composition will show unsoundness, and will not wear as well as ordinary steel rails. We know that silicon is used even in casting gun metal with the object of obtaining solid ingots to commence with, and the strength wanted is obtained afterward by hammering and other manipulations. Why should it then be excluded from the rail metal, when solidity in the rail is of equally great importance as in guns? I admit that an excess of silicon is objectionable on the score of safety, but I would not consider it too high unless the quantity rises to 0.12 per cent., or more than three times as much as Dr. Dudley allows, provided that the other hardening substances are in accordance with Dr. Dudley's formula. However, a complete analysis was made by my own chemist, Mr. Troilus, in conjunction with the chemist at the works in question, and the result of their analysis on the same boring taken at random from the steel agreed perfectly. These results I have entered in the inspection book in the ordinary way. Five analyses were made, and I kept the boring used in each analysis, in case any dispute should arise. I am pleased that I have had the opportunity of inspecting an order made under Dr. Dudley's formula and specification in all respects. I have been thus enabled to draw practical conclusions, and I think that the specification can, with great care in mixing the pig iron, be carried out, but I find that the cost is a great deal higher than in the ordinary working. In my opinion the course followed is not altogether desirable, as the results in the end are not as good as in the ordinary methods. However, if railway companies will insist upon adopting this specification, I can see it carried out.

I hope that the investigations and researches which Dr. Dudley has commenced will be continued by others as well as himself. For my part I will do my best in Europe, and I believe that I may flatter myself as being actuated by the same feeling as Dr. Dudley, viz., to ultimately arrive at the best specification for steel rails. No one could value the assistance of chemistry in steel making more than myself, and I may say that I started the chemical laboratory at the Crewe Steel Works, on the London & Northwestern Railway, about eleven years ago; but I do not hesitate to indorse the expressions of my friend Dr. Percy, the greatest chemical authority on iron and steel in England, when he says: "Let them be satisfied with ordinary physical tests, and take to chemistry only for explanations when any extraordinary results are obtained." In these words lies the truth; let the chemist help us, but not be master and dictator. Again, why should only one chemical composition be thought to be the right one? Rails may vary greatly in composition, and yet be equally good in wear, and if only one formula be specified, competition in tendering would naturally be reduced, and would cause unnecessarily high prices.

Conclusions.—Finally, we may look at the general experience resulting from the use of iron and steel rails. In 1868 I believe I laid the first results on a large scale before the railway world in a paper on the manufacture and wearing of rails, read before the Institution of Civil Engineers in England.* Since that paper was written the favorable opinion then expressed as to steel rails has only been strengthened, and as the price of such rails has been reduced, rails made of iron have been almost entirely superseded in the market. Railways on which there is so enormous an amount of traffic as on some in England, like the Metropolitan Railway, for instance, would never have been able to maintain their system and meet the requirements of such a large service of trains, if they had not been laid with steel rails. On the Continent the same remark applies with almost equal force. One of the most frequented lines in Germany, the Cologne-Minden, which has now been wholly laid in steel for the last seven years, gives the following result in comparison with the former use of iron rails. They formerly had an exchange of 7 per cent. per annum of the iron rails (which were, by the way, much superior to those now ordinarily employed in England), but during the seven years' wear of the steel rails there has not been so much as 1 per cent. replaced. What more proof, then, is needed? Similarly good results are obtained in France, and all over Europe, and as for cold climates, such as Scandinavia, Russia and Canada, steel is certainly more safe in point of strength than the iron rails. Therefore I see no reason why steel of ordinary quality should not be used in America. The investigations on the Pennsylvania Railroad must have been made under exceptional conditions, for I see no reason why they should give different results from those obtained elsewhere. It is true that the way in which steel rails sometimes break is startling, and makes one suspicious; but I can safely say that there were more accidents caused by the lamination of iron rails formerly than there now are from fracture of steel rails. I may give figures derived from official reports of the railway recently referred to, where, even with the greatest care in inspection and maintenance of road, fractures of the steel rails have occurred in the seven years during which they had been laid in no fewer than 1,400 cases; but, notwithstanding this, there has been no instance of the engine or train running off the line. We must conclude from this that the breakage of steel rails is not necessarily of a destructive or dangerous nature, if the lines are only watched by the plate-layers and railway inspectors. There are actually at the present time in England, hundreds of miles of old branch lines without any fish-plates at all, which might be compared to broken rails; still traffic is safe, though necessarily slow.

I will in conclusion refer to a single instance of a broken rail, which only by some singularly good fortune failed to cause an accident (I give a drawing of it in the appendix†). The rail broke on Dec. 26 last near Cologne, under the Berlin express, in no less than seventeen pieces. It had been in service for six years, and no signs of failure had been observed. When it was analyzed it was found to be of almost exactly the same composition as that which Dr. Dudley recommends, and the steel of the broken pieces conformed to his tests. This shows that exceptional fractures of steel rails will occur under all circumstances, but the number of failures is not nearly as great as happened when iron rails were used in former times. The long and short of the whole matter is that we now get steel rails without increased price, and with many times the amount of endurance and safety, than was previously the case with iron rails. The railway world has made greater advances in rail production to the advantage of all concerned, and I hope this will continue to be the case. It is far from my wish that supervision should be in any way lessened. Yet, on the other hand, I cannot advise my clients and the consumers generally to place much weight upon uselessly strict specifications, but rather to be satisfied with only what is really necessary. America in her growing rail manufacture will feel the need of inspection more and more, as

we have done in Europe, but I hope that the error into which we have fallen of specifying too much will be avoided, and it is with this view that I have stated frankly my opinion and given my reasons for it, based upon the results of practice. No country has honored me with so much confidence in the rail inspection as America, and I therefore feel a strong desire, as a token of gratitude, that my remarks should be taken to heart and considered carefully for the benefit, as I hope, for the country at large.

Steam on the Erie Canal.

In the annual report of Mr. S. B. Dutcher, Superintendent of Public Works of the State of New York, who has charge of the State canals, is the following paragraph on "cable towing:"

"Complaints from boatmen have been presented, regarding delays to navigation and injury to their boats by the boats of the New York Steam Cable Towing Company. These complaints became very frequent and in many instances accompanied by affidavits and demands for the removal of the cable. I appointed two men of much experience to carefully and thoroughly investigate the workings of the said cable boats and transmit herewith a copy of their report. The statements therein of injury to the banks and structures, and the delays to navigation are confirmed by other parties who have witnessed the results during the past season. Its workings are entirely impracticable, and the attention of the legislature is called to the matter, as one which should receive their early and earnest consideration. In my judgment the act permitting the introduction of this system of towing should be repealed."

This statement of the Superintendent of Public Works is based upon the following

REPORT ON CABLE TOWING,

by R. D. Ford and E. P. Roberts, appointed to examine and investigate the workings of the steam cable towing system, also all boats propelled by steam and navigating the canals, in relation to the effect they have generally upon the canals, which report in substance is as follows:

That from the first of August last to the closing of the canals they have carefully inspected the workings of the steam cable towing system along the line of canal wherever the system has been in operation. During the past season, however, cable towing has been in operation as follows:

Buffalo to Tonawanda.....	12 miles
Lockport to Rochester.....	62 "
Lodi lock to New London.....	34 "
	108 "

The principal difficulty in the way of successful navigation by the Belgian system is in the sharp curves or bends of the canal itself. On straight portions it cannot be said to have done much damage except in occasional instances, but abundant testimony is to be found of its destructiveness upon the canal banks at all points where short bends occur. At these points the cable instead of being in the centre of the canal is always hard to shore on short side of the bend and is frequently left on top of the tow-path or berme bank, as the case may be. In consequence of this, when the cable is picked up by the cable tug, the tug is forced hard to shore, and has the greatest difficulty in passing the bend, the tug and tow raking hard on shore, pulling off docking, masonry, stone from slope walls, earth, soils, gravel, and causing them to fall into the canal.

Great damage has been done to the bridge abutments whenever they happen to be situated upon berme-bank bends, as the cable is taken up close to the abutments, and the cable tug and tow are continually colliding with the same and tearing them to pieces. The swing bridge at Albion has been damaged a number of times during the past season, and is in danger of being thrown into the canal by subsequent collisions. At this point the berme bank bend is quite sharp, and in order to get around it the cable is laid through the northerly opening, and in consequence, it lays hard along side of the pier in the centre of the canal, and the boat, in picking up the cable as it passes, is brought close to the pier and bridge, scraping and damaging it seriously.

DIFFICULTIES IN OPERATING THE TWO SYSTEMS TOGETHER.

Under the present arrangements the two systems work very inharmoniously. The dangers and difficulties of navigating the canal with boats towed by cable and horses are very great; one must give way to the other in every instance, and this the cable company refuses to do. Two of the principal points which the cable company make are gain in time and cheapness in towing. Both these they have failed to accomplish. These points are of vital importance to the boatmen, but, after the past season's experience, their almost unanimous opinion is that the disadvantages far outweigh the advantages. The following will illustrate some of the cases in point:

1. A cable boat is going east with tow of five boats, she is close to the tow-path at a bend, when she meets a western bound boat. Now, the west-bound boat should take the inside, but can not, and is forced outside by the cable boat. The tow-line has, therefore, to be carried around the cable boat and passed under the hawser, subjecting the west-bound boat to great danger and trouble, beside placing her in a bad position, as it makes her liable for any damages she may do, and besides she is in danger of sinking by colliding with the boats in tow.

2. A cable boat is west-bound with tow, and meets a boat drawn by horses going east. The east-bound boat is obliged to cast off line from the team. The line is thrown over and carried to the stern of the cable boat, passed under the hawser and then back to the driver, and hitched to the team, the line passing under the balance of the tow. Now, it is frequently the case that the driver is obliged to leave his team in order to take this line, and in so doing the team becomes frightened at the steam, smoke and noise of the cable boat, and either runs away or backs over the bank, being killed or seriously injured.

3. An east-bound cable boat, with tow, is close on a tow-path bend at Wide Waters, where she meets a light west-bound boat, and the latter is, of course, forced outside. If the wind is very strong, she is liable to break her tow-line, and is blown over either to the marshes or the southerly side of the Wide Waters, and it frequently occurs that she lays there for hours and sometimes for days.

4. A cable boat going east is on the berme side of the canal, and passing along seemingly all right, making four miles per hour, with a tow of five or seven boats, when it meets a west-bound boat, and without warning the cable boat will shear into the west-bound boat. This is caused by the cable being out of position, it having been caught on a rock or boulder in the bottom of the canal and drawn over by the last cable boat going west, and the consequence is a collision, sunken boat or great damage to property and delay to navigation. The cable is supposed to be in the middle of the canal, but no boatman can tell which side the cable boat will take until they are actually along side, for the cable is left in all positions, and, being very

* Appendix VIII., German Specifications.

† See Appendix to translation of Styffe's Experiments on the Strength of Iron Rails at Different Temperatures.

‡ Webster on Iron and Steel at Low Temperatures, 1879—80.

§ Transactions American Institute of Mining Engineers, Vol. VII.

* Sandberg on the Manufacture and Wear of Rails, 1867-68.

† Appendix X, Drawing of Broken Rail.

taut, the cable steamer is obliged to follow wherever it is. In fact, no boatman feels safe with a cable boat in sight.

5. On a straight piece of canal a cable steamer with tow of loaded boats makes from three to five miles per hour, while loaded boats drawn by horses make from one and a half to two miles per hour. In consequence of this the cable steamers with tows are continually passing the horse boats, and here comes one of the worst features in this mixture of systems. While a tow is passing, it is impossible to steer the boat which is being passed, owing to the displacement of water being so great that she is liable to be thrown on to the banks of the canal or struck by some of the tow, or left hard on the bank after the tow passes, or she may be left across the canal perfectly helpless, and in a position to be run down by the next boat following.

ANGER FROM SHIFTING OF CABLE.

Great damage, danger and detention to both canal steamers and floats drawn by horses is experienced by reason of the wire cable being lifted out of the canal at sharp bends and left on the bank or struck by some of the tow. It occurs in this way: The cable in the straight canal lies near the centre of the prism, but in going around the bend it is drawn close in shore and in many places on the top of the bank. At the point where it leaves the centre of the canal and runs upon the bank it forms an obstruction which is frequently struck by passing boats, causing damages by ripping off iron shoes, rake-irons, rudder-blades, etc., and causing leaks. At the tow-path bend near Fort Porter, Buffalo, the cable has been across the canal and so high on the vertical wall as to completely block the canal several times, forcing the boats in and forcing them to stay there for hours, for it is no easy matter to draw a taut cable from off the bank; it requires the assistance of powerful tugs. During the past season detentions to navigation caused by the cable boats were frequent and inevitable, they arose principally from these causes.

THE SYSTEM NOT A SUCCESS.

The feasibility of any new system, discovery or invention can not be determined by a visit of inspection or a trial trip made under auspicious circumstances, but the comparisons of each day's result during a reasonable period of time ought to attest its practicability. Especially is this true of a system like the cable-towing system, started under very favorable circumstances, its great success in Belgium having given it the confidence of the community. It made a very favorable showing upon the trial trip which was made late in the season of 1879 from Buffalo to Rochester. The company at that time hoped to show still better results during the season of 1880. That season has now passed, and recorded facts are the only arguments needed to prove that, contrary to expectations of all parties interested in transportation, the Belgian cable-towing system has been far from a success. Abundant facts prove that steam cable-towing is not and never can be a success upon the Erie Canal. With the exception of twelve miles between Buffalo and Tonawanda, the cable has been laid upon what are known as the long levels, viz., between Lockport and Rochester and Syracuse and Utica. This distance is comparatively free from obstructions and difficulties. If the result shows that there is so much to condemn upon these most favorable divisions of the canal, what would be the consequences if it were to be continued and operated, as proposed, thro' the remainder of the canal, which is made up of short levels and sharp bends? It could only result in the entire stopping of all other navigation.

STEAM CANAL BOATS.

We have watched with satisfaction the rapid growth into favor of the steam canal boats. Their increase in number is the best guarantee of their success. During the past year very many new ones have been added to the list, and from the whole number we can only mention one that is an injury to the canal. This steamer, "The Annie Laurie," running from Syracuse east and west, is built like a towing tug, and the great draft of water and speed causes her to wash the canal banks. Her speed should be modified or she should be prohibited from running in the canal. Traveling as these steamers do alone, or with consorts, they do not in any way interfere with the navigation of other craft, nor do they wash the banks. By reference to the following statistics of cost and time in towing, the respective merits of the three systems may be easily ascertained:

Comparative Time of Towing between Buffalo and New York and return:

Boats towed, load east and light west.....from 22 to 25 days.
Boats towed by horses, load both ways.....from 25 to 28 days.
Canal steamers, load both ways.....from 18 to 22 days.
Canal steamers, with consort, load both ways, from 20 to 25 days.
Boats towed by Steam Cable Towing Company.....from 30 to 45 days.

According to these figures, the main point of argument in favor of the Belgian system of towing is destroyed, they having utterly failed to make trips as fast as by the ordinary way of towing by horses or mules. Nor have they been able to compete with either of the other systems in economy, as the following figures prove.

Comparative Cost of Propelling Boats through the Canal:

Horse-power, two teams to boat.....15 to 17 cts. per mile.
Steam canal boat.....15 to 18
Steam canal boat with consort.....18 to 20
Boats towed by cable system.....20

THE SCRAP HEAP.

An Ingenious Farmer.

There is nothing like having presence of mind. A farmer near Mount Brydges, Ontario, was drawing a load of logs across the Great Western Railway track when the sleigh stuck on the rails. Now, when a loaded, iron-shod sleigh gets stuck on a railroad track it is no slight job to take it off, and the farmer's horses proved unequal to the task. As the Atlantic express was in sight, some people might have lost their presence of mind. Not so the farmer. He quietly unhitched his horses and removed himself and them to a safe distance. He did not signal the engineer, as some foolish people would have done, but waited with great faith in the power of the engine to do what his horses were unable to accomplish. To the credit of steam be it said, that he was not disappointed. Not only was the sleigh removed from the track, but the engine also. As was previously remarked, there is nothing like having presence of mind.—*Detroit Free Press.*

A Private Car.

There was on exhibition a few days ago in Chicago, a new private car constructed by the Ohio Falls Car Co., at Jeffersonville, Ind., for President W. D. Washburn, of the Minneapolis & St. Louis Railroad, which is beyond doubt one of the finest railroad coaches ever built. In fact, there is but one car in existence that is superior to it, and this is the celebrated Pullman car. The principal feature of President Washburn's car is the woodwork which embellishes its interior, and in this respect it is even superior to the Pullman car. The walls of the observatory in the rear and the drawing-room in the front end of the car are of the choicest butternut veneering, carved in beautiful designs on white holly. The ceilings

RAILROAD EARNINGS IN DECEMBER.

NAME OF ROAD.	MILEAGE.				EARNINGS.					EARNINGS PER MILE.		
	0.	1879.	Inc.	Dec.	Per c.	1880.	1879.	Increase.	Decrease.	Per c.	1880.	1879.
Ala. Gt. Southern	290	290				\$ 61,669	\$ 53,478	\$ 8,191		15.5	\$ 213	\$ 188
Atchison, Top. & S. F.	1,544	1,152	392		34.1	850,000	619,484	230,516		37.2	551	538
Bur. Cedar Rap. & No.	492	434	58		13.4	189,068	176,204	16,864		9.6	392	406
Cairo & St. Louis	146	146				37,407	28,643	8,764		30.6	256	196
Central Pacific	2,580	2,335	245		10.5	1,853,000	1,335,870	517,130		38.7	718	572
Ches. & Ohio	435	435				218,009	179,161	38,848		21.6	501	412
Chi. & Alton	840	840				553,564	553,014	550		0.1	659	658
Chi. & Eastern Illinois	220	159	61		38.4	128,981	80,025	48,956		61.2	586	513
Chi. Mil. & St. Paul	3,627	2,182	1,445		65.7	1,426,086	1,000,057	365,129		34.4	393	486
Chi. & Northwestern	2,625	2,289	336		14.6	1,490,322	1,325,895	164,427		12.4	568	579
Chi., St. P., Minn. & O., East Div	310	280	30		19.2	152,915	123,953	28,962		23.4	493	515
St. P. & S. C. Div.	620	392	228		58.5	128,204	90,672	37,532		41.4	297	231
Cin., Ham. & Dayton	345	345				228,807	204,429	24,378		11.9	633	593
Cin., Ind. St. L. & Chi.	390	300				191,231	189,251	1,980		1.0	637	631
Cin. & Springfield	81	81				93,608	81,407	12,111		14.9	1,156	1,006
Cleve., Col. Cin. & Ind.	391	391				388,454	377,050	11,398		3.0	993	964
Cleveland, Mt. Ver. & Del.	144	157		13	8.3	35,538	36,047		509	1.4	247	230
Denver & Rio Grande	551	337	214		63.5	349,196	131,112	218,084		167.7	634	353
Denver, So. Pk. & P.	180	116	74		63.8	78,556	136,064		57,708	42.4	412	1,173
Des Moines & Ft. Dodge	84	84				36,694	24,233	12,461		51.5	437	289
East Tenn., Va. & Ga.	270	270				116,880	118,830		1,950	1.6	433	440
Eastern	482	282				231,656	217,894	13,762		9.3	821	773
Flint & Pere Marq.	299	280	19		6.8	151,112	117,026	34,086		29.1	505	418
Gal., Har. & San Antonio	233	215	18		8.4	136,441	124,496	11,945		9.6	586	579
Georgia	307	307				151,414	150,174	1,240		0.8	493	480
Hannibal & St. Jo	292	292				257,241	253,233	4,008		1.6	881	867
Houston & Tex. Cent.	580	505	75		14.8	438,690	382,230	56,460		14.7	756	757
Illinois Cent., Ill. lines	914	854	60		7.0	512,362	521,270		8,908	1.7	561	610
Iowa lines	402	402				142,929	134,795	8,134		6.0	355	335
Ind., Bloom. & Western	212	212				104,619	106,054		1,435	1.4	499	501
Int. & Gt. Northern	557	526	31		5.9	200,801	218,268	42,533		19.5	468	415
Lake Erie & Western	362	308	54		17.5	102,503	74,818	27,685		36.9	283	243
Louisville & Nash.	1,837	1,107	730		66.3	913,100	681,811	231,289		34.0	497	616
Memphis & Charleston	292	292				157,593	142,101	15,492		10.9	540	486
Memphis, Pad. & No.	115	115				17,110	15,186	1,924		12.8	149	132
Mo., Kansas & Texas	786	786				358,672	380,927		22,255	5.8	456	485
Mobile & Ohio	506	506				288,021	316,626		28,605	9.0	569	626
Nash., Chatta. & St. L.	454	454				175,996	185,653		9,657	5.2	388	409
N. Y. & New England	316	316				197,770	178,880	18,890		10.6	626	566
Northern Central	326	326				494,310	414,598	79,712		19.2	1,516	1,273
Northern Pacific	760	644	106		16.5	192,582	115,084	77,498		67.4	257	179
Paducah & E'town	185	185				37,063	37,557		494	1.3	200	203
Pennsylvania	1,890	1,872	18		0.9	3,547,827	3,453,924	93,903		2.7	1,877	1,845
Peoria, Dec. & Evans's	192	78	114		146.2	37,159	16,259	20,900		130.5	194	208
St. L., Alt. & T. H. Main Line	195	195				105,362	110,410		5,048	4.6	540	566
Belleville Line	71	71				78,120	64,751	13,369		20.6	1,100	912
St. L., Iron Mt. & So.	685	685				655,100	655,413		313	0.1	956	957
St. L. & San Francisco	627	506	121		24.1	222,854	212,896	9,958		4.7	355	421
St. P., Minn. & Manitoba	740	600	140		23.3	297,640	170,677	126,963		74.4	402	284
Scioto Valley	100	100				24,802	30,379		5,577	24.8	248	344
Union Pacific	3,104	2,776	328		11.9	1,869,853	1,659,156	210,697		12.7	602	598
Wabash, St. L. & P.	2,487	2,166	321		14.9	962,663	980,661		17,998	1.8	387	453
Total, 52 roads	36,183	30,958	5,225	13	16.9	21,735,354	19,059,072	2,836,739	160,457	14.0	601	616
Total increase								2,676,282				

RAILROAD EARNINGS, YEAR ENDING DECEMBER 31.

NAME OF ROAD.	MILEAGE.					EARNINGS.				EARNINGS PER MILE.					
	1880.	1879.	Inc.	Dec.	P.c.	1880.	1879.	Increase.	Decrease.	P. c.	1880.	1879.	Inc.	Dec.	P. c.
						\$	\$	\$	\$		\$	\$	\$	\$	
Ala. Gt. Southern	290	290				643,921	444,122	199,799		45.0	2,220	1,531	689		45.0
Atch. Top. & S. F.	1,338	958	380		40.0	8,543,185	6,381,443	2,161,742		33.9	6,385	6,061		276	4.4
Bur. Ced. Rap. & N. W.	492	434	58		13.4	2,053,131	1,534,940	518,192		33.7	4,173	3,537	636		18.2
Cairo & St. Louis	146	146				413,166	267,243	145,923		54.7	2,830	1,830	1,000		54.7
Canada Southern	400	400				3,717,278	2,965,365	751,913		24.1	9,293	7,383	1,905		24.1
Central Pacific	2,498	2,250	248		11.0	20,410,424	17,153,161	3,257,263		19.0	8,171	7,624	547		7.5
Chesapeake & Ohio	435	435				2,674,308	1,930,539	743,769		38.7	6,148	4,452	1,696		38.7
Chicago & Alton	840	782	58		7.4	7,681,253	5,755,677	1,925,576		33.5	9,144	7,390	1,754		24.1
Chi. & Eastern Illinois	216	159	57		35.6	1,299,011	873,456	425,555		48.8	6,014	5,493	521		48.8
Chi. Mil. & St. Paul	2,861	1,951	910		45.5	13,114,810	10,012,819	3,101,991		30.9	4,584	5,132		548	10.7
Chi. & Northwestern	2,435	2,176	259		11.7	19,423,684	16,098,373	3,325,311		20.6	7,977	7,390	578		7.8
Chi., St. Paul, Minn. & O., Eastern Div.	281	245	36		14.8	1,609,593	1,259,403	350,190		27.8	5,728	5,140	588		11.4
St. P. & S. C. Div.	500	354	146		41.6	1,481,540	1,107,845	373,695		33.7	2,963	3,130		167	5.3
Cin. & Springfield	81	81				919,996	801,748	118,248		14.7	11,358	9,808	1,460		14.7
Cleve. Col. Cin. & Ind.	391	391				4,396,019	3,718,500	677,519		18.2	11,243	9,510	1,733		18.2
Cleve., Mt. V. & Del.	155	157		2	1.2	422,077	387,801	34,276		8.8	2,723	2,470	253		10.3
Denver & R. G.	460	337	123		36.2	3,452,616	1,227,701	2,224,915		181.2	7,566	3,634	3,872		107.8
Denver, So. Park & P.	155	93	62		66.7	1,768,756	902,745	866,011		95.9	11,405	9,707	1,698		17.5
Des Moines & Ft. D'ce	84	84				324,722	225,402	99,320		44.1	3,866	2,684	1,182		43.8
East Tenn., Va. & Ga	270	270				1,278,879	1,077,233	201,646		18.7	4,737	3,960	747		38.7
Flint & Pere Marq.	299	280	18		7.5	1,597,445	1,148,024	449,421		39.1	5,364	4,100	1,264		39.1
Grand Trunk	1,273	1,344		71	5.5	10,603,859	9,021,278	1,582,581		17.5	8,330	7,162	1,168		17.5
Grand Western	526	526				5,175,542	4,509,699	665,843		14.8	9,840	8,573	1,267		24.7
Hannibal & St. Jo.	292	292				2,335,965	1,967,305	368,660		27.0	8,685	6,840	1,845		27.0
Houston & Texas Cen	526	505	21		4.2	3,738,042	3,205,683	532,359		16.5	7,103	6,344	759		12.0
Ill. Cen., Ill. lines	893	854	39		4.8	6,298,315	5,711,280	587,035		10.3	7,053	6,688	365		5.5
Iowa lines	492	492				1,679,171	1,523,161	156,010		10.2	4,177	3,789	388		10.2
Ind., Bloom. & West.	212	212				1,223,097	1,160,743	62,354		5.4	5,770	5,474	296		5.4
Inter. & Gt. Northern	533	520	13		2.5	1,961,041	1,775,861	185,180		10.4	3,679	3,415	264		7.7
Lake Erie & Western.	344	308	36		11.4	1,038,725	965,259	63,466		88.3	3,864	3,527	337		67.3
Lake Shore & M. So.	1,178	1,178				18,730,000	15,001,492	3,728,508		22.3	15,801	12,962	2,839		22.3
Louisville & Nash.	1,558	1,020	529		51.8	9,432,173	6,007,386	3,424,787		57.0	6,034	5,838	216		3.5
Mem. & Charleston	292	292				1,212,614	912,736	299,878		32.8	4,153	3,125	1,028		32.8
Mem., Pad. & No.	115	115				213,238	159,826	53,412		33.4	1,854	1,390	464		33.4
Michigan Central	804	804				9,100,000	7,345,700	1,754,300		23.9	11,318	9,136	2,182		23.9
Mo., Kan. & Texas.	786	786				4,163,070	3,344,292	818,778		24.8	5,297	4,255	1,042		24.8
Mobile & Ohio	506	511		5	0.9	2,269,865	2,127,487	142,378		6.7	4,480	4,160	326		7.8
Nash., Chatta. & St. L.	454	454				2,049,440	1,800,878	248,571		13.7	4,514	3,967	547		13.7
Northern Central	326	326				5,050,387	4,107,948	942,439		22.9	15,492	12,601	2,891		22.9
Northern Pacific	702	644	58		9.0	2,540,297	2,047,555	535,682		32.7	3,679	3,143	536		16.8
Pad. & Etowah	185	185				404,193	343,293	60,900		18.6	1,185	1,043	142		16.8
Pennsylvania	1,878	1,834	44		2.3	41,280,072	38,420,729	6,639,393		19.2	17,070	18,877	3,007		19.2
Poor., Dec. & Evans.	192	78	114		146.2	448,927	260,902	188,025		72.0	2,328	3,345		1,007	30.0
Pitts., Titusville & B.	158	120	38		31.7	573,395	467,136	106,259		22.8	6,339	3,893		264	6.6
St. L. A.&T.H. & M. Lf'e	195	195				1,379,607	1,040,542	339,065		32.6	7,075	5,336	1,750		32.6
Bellefonte Line	71	71				677,720	565,521	112,199		19.9	9,545	7,965	1,580		19.9
St. L., Iron Mt. & So.	685	685				6,258,419	5,292,611	965,808		18.2	9,136	7,726	1,410		18.2
St. Louis & San Fran.	570	393	177		45.4	2,693,572	1,633,843	1,059,729		62.7	14,725	4,308	517		12.8
St. P., Minn. & Man.	654	508	86		15.1	3,157,744	2,540,573	617,171		24.3	4,828	4,473	355		7.8
Scioto Valley	100	100				316,545	292,408	24,137		8.2	3,165	2,924	241		8.2
Union Pacific	2,950	2,650	300		11.5	25,404,106	20,609,615	4,894,491		23.7	8,642	7,777	865		11.5
Wab., St. L. & Pacific.	1,850	1,407	443		31.6	12,332,152	9,110,823	3,221,329		33.2	6,668	4,475	1,993		33.2
Total, 52 roads	35,836	31,661	4,253		78	281,498,966	224,787,361	56,711,705		25.2	7,855	7,100	755		10.4
Total increase			4,175		12.2			56,711,705							



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

DECEMBER EARNINGS.

December earnings are given in our table for 52 railroads, having in 1880 36,183 miles of railroad, which was about two-fifths of the total in operation in the United States, and 16.9 per cent. more than the same 52 roads worked the previous year. With this increase of 16.9 per cent. in mileage the roads earned 14 per cent. more money, and the average earnings per mile of road decreased from \$616 to \$601, or 2.4 per cent.

Of the 52 roads 25 have some increase in mileage; all but 13 of them show an increase in gross earnings and all but 21 an increase in earnings per mile. The decreases are more numerous than usual recently, and there are fewer of the enormous increases that have been shown in previous months, but the earnings were still very large. Last year our table for December had reports from 42 roads, and these showed the enormous increase of 18.8 per cent. in average earnings per mile over 1878; so that a gain in 1880 was a gain over a remarkably favorable month. In 1880 there was the enormous increase of new mileage on many roads which tended to reduce the average earnings per mile. There was but one other month in the year when there was any decrease in average earnings per mile. The percentages of increase or decrease in the average earnings per mile of the roads reported in our monthly tables have been as follows in successive months of 1880:

Jan., increase.....16.0 per cent.	July, increase.....9.7 per cent.
Feb., ".....13.5 " "	Aug., ".....12.0 " "
March, ".....19.0 " "	Sept., ".....3.6 " "
April, ".....14.3 " "	Oct., decrease.....0.2 " "
May, ".....10.4 " "	Nov., increase.....4.4 " "
June, ".....18.7 " "	Dec., decrease.....2.4 " "

In every month of 1880 average earnings were large, and the fluctuations in the comparisons with corresponding months of 1879 are due chiefly to the fluctuations of that year, in which earnings were not so uniformly good. This it will be well to remember

when considering reports of earnings in 1881. Where the roads reporting are the same in extent, they will usually (if not lines in new country) be very prosperous when their monthly earnings are as large as in 1880, and, in view of the large additions of new road, a reduction in the average earnings per mile is entirely compatible with increased profits.

The largest increases in earnings per mile shown by our table are 76 per cent. on the Denver & Rio Grande, 51½ on the Des Moines & Fort Dodge, 31½ on the Cairo & St. Louis, 26 on the Central Pacific, 43½ on the Northern Pacific, and 42 on the St. Paul, Minneapolis & Manitoba. There is no other, we believe, of as much as 25 per cent. In earlier months there have been some roads with gains of 100 per cent., several with 50 per cent. or more, and many with more than 25 per cent.

The decreases, though comparatively numerous, are usually not great, the chief exception being the Denver, South Park & Pacific, whose earnings per mile were 65 per cent. less than in 1879. Of all the roads in the list of 52, only two, the Pennsylvania and the Northern Central, had larger earnings per mile than this road in 1879; in 1880 the South Park road stood thirty-fifth. Last December its earnings per mile were not two-thirds of those of the Denver & Rio Grande; in 1879 they were more than three times as great. The Rio Grande road has gained 76 per cent., while the South Park road has lost 65 per cent.

The gain of the Central Pacific is as notable as any, as its earnings per mile have generally decreased for several years past, and it works the Southern Pacific, which has been extended greatly in a new country. Something of the gain is probably due to the activity in mining and prospecting in Arizona, which no other road reaches, and in Northern Mexico, which it most nearly approaches—but probably more to the movement of the great wheat crop of California, which is much larger than ever before, and to the general activity of traffic. The Atchison, Topeka & Santa Fe, which has nearly all the New Mexico traffic, also shows a very satisfactory increase of traffic in spite of its long extension in new country. These roads and the Union Pacific are the chief railroads that serve the vast interior country between the Missouri and the Sierra Nevada. The two latter have large earnings from the fertile agricultural districts of Nebraska and Kansas, but west of the 100th meridian all these roads are supported chiefly by a country of plains and mountains, where the chief industries are mining and stock-growing, and the increase in their earnings is good evidence of the rapid growth and development of this vast territory, which, until very recently, was occupied only near a few widely separated mining centres, and afforded but a very light (though sometimes profitable) traffic to the few railroads that penetrated it.

The examination of the trunk-line earnings is much less interesting for want of any report from the New York Central & Hudson River, which for a year before had given figures which added greatly to the value of this table as an indication of the general condition of traffic in the United States. Six roads that report for December, having an aggregate of 3,095 miles of road then, against 18 miles less in 1879, have a large traffic in through freight carried at the New York Chicago rates. Four of these roads had larger earnings in 1880, but their aggregate increase was only about 4 per cent. On the bulk of the through traffic eastward the rates were lower in 1880, and the traffic was probably not very different in amount, and such changes as have occurred were probably due to the differences in amount of local freight and passenger traffic.

Below we give our usual table showing earnings per mile in December for the last seven years:

	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Atch., Top. & S. P.	\$201	\$214	\$294	\$317	\$303	\$538	\$551
Burl., C. R. & N.	287	377	440	314	287	400	302
Cairo & St. Louis	235	190	118	...	122	190	256
Can. Pacific	996	930	820	984	658	572	718
Chic. & Alton	591	568	532	497	503	558	659
Chic. & E. Ill.	446	438	374	394	513	586	586
Chic., Mil. & St. P.	474	534	430	474	414	480	393
Cin., H. & N. W.	557	518	502	485	502	579	568
Chic., H. & Dayton	664	707	603	557	560	592	663
C. C. & Ind.	832	852	900	745	710	964	993
C. Mt. V. & Del.	...	124	189	...	191	230	247
Denver & R. G.	250	311	182	240	...	350	634
Eastern	...	619	704	620	773	821	...
Georgia	690	653	586	499	365	480	493
Hannibal & St. Jo.	...	512	446	401	611	867	881
Ill. Cen., in Ill.	749	721	605	581	552	610	561
Ind. Cen., in Iowa	377	425	284	335	294	335	355
Ind. Bloom. & W.	352	390	330	271	289	501	434
Int. & Gt. North.	450	414	432	386	432	415	468
Louis. & Nash.	558	552	593	509	520	616	497
Mem. & Charles	...	435	498	...	...	...	...
Mem. Pad. & No.	...	149	199	158	132	149	...
Mo., Kan. & Tex.	322	376	377	355	309	485	456
Mobile & Ohio	731	552	587	505	573	628	589
Nash., C. & St. L.	482	408	408	428	428	400	388
Northern Cen.	1,307	1,195	1,077	1,028	1,272	1,516	...
Paducah & Eliz.	...	166	138	203	200	...	...
Penna.	1,021	1,724	1,824	1,595	1,459	1,845	1,877
St. L., A. & T. H.	...	...	...	...	...	...	...
(Belleville Line)	744	716	765	583	684	912	1,100
St. L., I. M. & So.	591	740	742	769	684	957	956
St. L. & San Fran.	523	...	381	322	305	421	355
Scioto Valley	...	...	...	...	201	304	248

Of the 32 roads in this table 12 had larger earnings

per mile in December, 1880, than in any other December for which their earnings are given.

In 1880 the earnings of 19 out of 32 were larger than in 1879; of 25 out of 30 they were larger than in 1878; of 23 out of 30 they were larger than in 1877; of 21 out of 30 they were larger than in 1876; of 16 out of 27 larger than in 1875; and of 14 out of 24 larger than in 1874. Among those that had larger earnings per mile in 1874 are the Central Pacific, the Chicago, Milwaukee & St. Paul, the Georgia, the Illinois Central (both in Illinois and Iowa), the Louisville & Nashville, the Mobile & Ohio, and the Pennsylvania. In all these cases, except the Illinois Central, the decrease has doubtless been due to increase of mileage, and the earnings of that part of their roads which were in operation in 1874 were probably at least as great in 1880 as in that year.

For the calendar year our table has reports of 52 railroads, with 35,836 miles of road in 1880, which is 13.2 per cent. more than they worked in 1879. These 52 railroads earned gross in 1880 \$381,498,966, which is no less than \$56,711,705, or 25.2 per cent., more than they earned in 1879, and their average earnings per mile of road increased from \$7,100 to \$7,855, or 10.6 per cent. Every one of the 52 roads shows an increase over its 1879 earnings; and this great and general gain is over a favorable year. Last year our table showed an average increase of 5.1 per cent. in earnings per mile; and two years ago the 29 roads reporting showed the same earnings per mile in both 1877 and 1878.

The returns of the last few months indicate that we will not have in 1881 anything like such an increase in earnings over 1880 as we had last year over 1879. Last year was evidently an extraordinary year, and to the greater number of carriers was extremely satisfactory. There is, however, reason to expect that until harvest at least the traffic in agricultural products will be as great as last year, and in manufactures larger, with probably more passenger traffic. We cannot now tell whether the great number of railroads that carry agricultural products at trunk-line rates from the West to the East will get as large a share of this traffic or so high rates for carrying it; but we think it hardly probable. Indeed, they have all this winter been carrying at lower rates than last winter, and when navigation opens the number of new vessels added to the lake fleet will very likely keep down lake rates to such an extent that the 80 cent rate which the railroads maintained throughout last summer will be impracticable: this will depend somewhat, however, on the time that lake navigation opens; and doubtless the stock of vessels will not be so much larger at the opening as later in the season, so that the vessel competition may be felt most when the next harvest begins to move.

Further, a great deal depends on the harvest itself. Doubtless there will be a considerably larger area cultivated than ever before; but no one can say how the harvest will turn out. We should remember, however, that, taking the country as a whole, we have had remarkably good crops for four successive years, and we must not count upon having them always hereafter.

But a failure, even of crops, will not now have anything like the effect that it would have had a few years ago. Now all other industries are active—many of them intensely active—and as it has taken years to get them under full headway, so they will not now be seriously checked by any ordinary obstacle. But still the quality of the coming harvest will have a very considerable effect on earnings, and doubtless will be very great on many of the new roads in Dakota, Nebraska, Kansas, etc. It will also have some effect on the migration to the new lands in the West.

It must be remembered that the great gain in earnings, in 1880 was accompanied quite generally by a great increase in expenses. Materials and wages have been much higher, and if the present demand for supplies keeps up, prices are pretty sure to rise still further. However, there is little doubt that 1881 will be a prosperous year for the railroads, though probably a great many men will be disappointed in it. Some seem to expect that hereafter railroad earnings will go on increasing at the rate of about 20 per cent. a year. When these people buy railroad stocks at prices based on this supposition, they are so sure to be disappointed that it does not matter whether their disappointment comes this year or next.

THE SELECTION OF FIREMEN AND THE APPOINTMENT OF ENGINEERS.

An unflinching test which will determine a man's character and capabilities with unerring precision has never yet been discovered. When it is necessary to form an opinion of a person's character and efficiency we are obliged to infer from as much of his appearance, conduct and conversation as we may see, hear or know of, what the physical traits, qualities of mind,

moral characteristics or mental acquirements are which would be the antecedents of the acts, thoughts or opinions which we have observed. It must be admitted, though, that such estimates of the character, acquirements and capabilities of persons are often very erroneous and misleading. Yet the success of an undertaking is often dependent upon the choice of the agents who are to carry it out. It, therefore, becomes of the utmost importance that those who have charge of important affairs, the conduct of which must be intrusted to subordinate agents or employes, should exercise a wise selection in their appointment, and use some method which would be reasonably certain to reveal, in some measure, the capacity of the appointees.

These remarks apply with especial force to the selection of locomotive runners or engineers. They are required to act not only with diligence and care in the performance of their regular duties, but in some emergencies with great courage and presence of mind. It is, of course, possible to tell from day to day, or from month to month, whether a man is running a locomotive economically, and whether he is competent to perform the ordinary and regular duties of his occupation; but great and sudden emergencies seldom occur, and if, when they do come, a man is deficient in the qualities demanded by such occasions the result may be disastrous. It is not surprising, then, that railroad managers have of late given special attention to the methods of appointing and promoting locomotive engineers and firemen.

The following letter from the Superintendent of Machinery of a well-managed road indicates the attitude of mind in which the subject is regarded, not only by the writer, but probably by many others:

"Hitherto on this railway it has been the custom when locomotive runners have been required to promote the senior fireman. We propose now to establish some system of examination of the men, in order to ascertain their qualifications, so that we may be able to promote the men who are the best qualified and likely to make the best engineers, without regard to seniority.

"Do you know of any railroads that have inaugurated this method? If you know the principle of any such method, or could give me any information on this point which would be of use to me, I would feel much obliged."

This letter suggested that the subject was one which merited discussion, and that the latter might call out from others some expression of opinion, and lead them to give the results of experience, which would be of value to those who are in the inquiring condition of mind that is indicated by the letter of our correspondent.

At one of the conventions of the Master Mechanics' Association, some years ago, the manner of appointing locomotive runners was discussed. It was then generally agreed, by those who took part in the discussion, that those who were trained as skilled mechanics do not make the best locomotive runners, but that to begin while quite young as firemen was in every way the best training for the responsible position which locomotive engineers must fill. This view is now, we think, generally held by railroad managers and those in charge of the motive power of our roads. Of course considerable knowledge is required of the construction and operation of engines, to be able to run them intelligently, but as the machinery of most roads is now managed by the men who run locomotives need very little of the kind of skill required to build or repair them, and generally this fact is recognized, and engineers are now usually appointed from the firemen, who are promoted.

It is evident, though, that if this is the case, the process of the selection of the persons from whom appointments to such responsible positions will be made should begin before the firemen are employed. The following order, issued recently to the foremen of the machine shops on a prominent road, was quite naturally suggested by the experience with this system of making appointments. The order was as follows:

"Hereafter all locomotive engineers will be made from firemen. It is, therefore, highly important that the firemen you hire should be of the *right stock*."

The question then comes up, What is the "right stock?"

It has been well said that "there is more in the breed of men than there is in the breed of horses," and it is as old as the Ten Commandments that "the iniquity of the fathers is visited upon the children." That physical, mental and moral traits are inherited is as certain as almost any other observed fact in nature. Therefore it seems an excellent plan to learn something about the parents of candidates for firemen, and see them before employing their sons. The antecedents of the former should justly have great weight in an estimate of the character of the sons. It is no doubt more difficult for the son of a liar to tell the truth, or of a loafer to be industrious, or of a drunkard to be temperate, than it would be if the par-

ent was honest, diligent, or did not love rum unwisely, and too well. The sadness and apparent injustice of this law will not be discussed here. All that is needed is to state it and recommend that it ought to be heeded. It should be said, though, that it sometimes happens that a man who is a miscreant will have a wife in whose character good traits are apparently substituted for the evil ones of her husband. In such cases it often happens that the law of heredity passes the husband by, with what seems like indifference, and selects for the offspring the traits of the best of the parents only. The converse of this is not so often true, and when the mother is at fault nature seldom seems to compensate for her infirmities. Generally, then, it will be wise to give some consideration to the breeding of candidates for firemen before they are appointed.

As the duties of both a fireman and engineer often requires much physical endurance, and sometimes the exercise of great strength, it is important that those who hold such positions should have good health and be of sound body. The case which occurred on one of the Brooklyn ferry-boats last year, on which the pilot was stricken with apoplexy or heart disease while performing his duties, indicates a source of danger which happily is infrequent, but only a few weeks ago on the New York, New Haven & Hartford Railroad, an engineer of the fastest train on that line suddenly became so ill that the fireman was obliged to run the train to its destination. It, therefore, seems that candidates for the position of firemen should be subjected to a physical examination before being appointed. Nearly all railroads employ a surgeon, either directly or indirectly, who could readily conduct such examinations.

Color-blindness, it may be said, is a very much over-written subject. It is undoubtedly true, though, that there are persons who cannot distinguish a red signal from a green one, and that it is dangerous to employ men of that kind as engineers. The men from whom engineers are to be made should undoubtedly be able to discern signals from their color, and should be examined to determine whether their vision is in a normal and healthy condition.

It is difficult to apply any test to determine the degree of intelligence of a man which will be in any way conclusive. Of course he should know how to read and write, and have some knowledge of arithmetic, but more than that, he should have that texture of mind which will enable him to apprehend things in their true relations, and draw sound deductions therefrom. Perhaps nothing indicates the degree to which a person possesses this quality of mind better than the narration of facts with which he is familiar. It is well then in determining upon a person's fitness to induce him to talk about things with which he is familiar, or, to take the advice of a distinguished writer, "See the man of whom you at present have the most favorable opinion: see him before you make up your mind finally to appoint him. For there is something in the aspect of a man which letters of recommendation and testimonials will not tell you."

Of the moral characteristics which young men should have who are expected ultimately to have charge of locomotives, it is hard to judge. Most of us were taught in youth that lying, stealing and intemperance are evil. The verdict of the world after some thousands of years of experience is, that these vices unfit a person for the duties of life. It is hardly necessary, though, to write a homily on the Ten Commandments. After learning as much about the conduct of candidates as practicable, though, it should also be learned whether they pay their debts. There is hardly any external indication of moral obliquity, which is not actually criminal, that is so significant as that of a disregard of pecuniary obligations. Before appointing firemen or engineers, therefore, it is a good rule to first find out whether they pay what they owe, or at least whether they pay those which it is possible for them to pay.

Another important trait which firemen and engineers should have is ability and inclination to obey orders promptly and willingly. A man who is a noisy brawler is quite sure to be troublesome. The testimony of those by whom he has been engaged before, or of school-teachers, will generally throw some light on this aspect of a young man's character. Or, to quote again from our author: "What now is a most valuable aid in the choice of a man to fill up any office is, the opinion, if you can get it honestly given, of older and more experienced men, about the qualification of a candidate."

It is apparent that running locomotives has developed into a distinct trade, and that men will in future be trained for it just as they are for other occupations. The knowledge and skill which a man must have in this calling are now recognized as being quite

distinct and different from those required in a mechanic. A few years ago it was considered of great importance that a locomotive runner should be a skilled machinist and be able to make repairs when needed, and in fact take care of the engine that he ran. All this has been changed, and on all important roads now he is not even required to set out the packing of the pistons or repack a stuffing-box. All such duties are delegated to those whose special duty it is to do such work.

As it has been a distinct and separate trade, it is essential that those who are selected to learn it should be of the "right stock." So much has been written on this branch of the subject, however, that the promotion of firemen to engineers must be deferred to another time.

RECENT ENGLISH DECISIONS.

The recently published numbers of the English court reports contain several railroad cases which may have application in this country.

Corporate Powers of the Companies.—The House of Lords has finally decided a question of the power of one company to supply rolling stock to another. The case arose out of arrangements between the Great Eastern Railway Company and the London, Tilbury & South End Railway, for the working of a branch or extension. These arrangements were made under an act of Parliament saying nothing about contracts to furnish rolling stock but containing these words: "The two companies may enter into agreements with respect to the working, maintenance, and management of the Extension Railway, and of the railways of the two companies connected therewith, etc." The Great Eastern Company, which appears to have been the owner of the Extension road, confided the operating of it to the Tilbury Company; and, as a part of the arrangement, undertook to supply the Tilbury Company with locomotives and rolling-stock. This plan was made with the approval of the shareholders of both companies. It was, however, unsatisfactory to manufacturers of locomotives and cars; and they instituted a suit, through the Attorney General, seeking to break it up. The idea seems to have been that manufacture of rolling stock by one railroad company for another would tend to diminish the demand on the other manufacturers. The argument was that letting locomotives and cars is not within the legitimate powers of a railroad company. But the House of Lords has decided, and the Court of Appeal was previously of the same opinion, that, whether or not it is unlawful generally for a railroad company to lease rolling stock without special leave, there was, in this case, a special leave. In other words, a general permission in an act for a consolidation or co-operation of companies, allowing the two companies to enter into agreements with respect to the working of their roads, is sufficient to enable either one to provide rolling stock for the use of the other.

An act of Parliament, passed nearly twenty-five years ago, commands railroad companies "to afford all reasonable facilities for the receiving, and forwarding and delivery of traffic upon and from" their several roads. A more recent law has created a Board of Railway Commissioners, which we have often spoken of, and whose yearly reports and many of whose decisions we have published, charged with enforcing obedience by the companies to the earlier law requiring facilities. The town authorities of Hastings applied to these Commissioners to require the Southeastern Railway Company to improve its stations in that town. They complained that the station was built many years ago, since which the traffic had largely increased and the building had become inadequate. They wished the company to enlarge the building, to improve the "booking office" and the waiting and refreshment rooms, to lengthen and deepen the platforms, and to provide better warehouse accommodations for goods and pens for cattle. The Commissioners ordered several of these improvements to be made. The company was willing to make them in part, but refused to do as much as the Commissioners required. The Queen's Bench judges have decided that the powers of the Commissioners are not so extensive as to include giving orders to a company to enlarge or remodel its station, or otherwise direct the expenditure of new capital. Their powers relate to securing from the companies proper facilities for receiving, forwarding and delivering traffic; now the more reasonable meaning of this expression is that the Commissioners are to oversee the operating of the road, the arrangements of the company for carrying on its business of transportation. It would be a strained construction of the expression to make it comprehend (as the Commissioners claimed that it should), power to order erection of additional buildings, or to alter the internal arrangements of stations, make additional

yards, or lay side-tracks and branches. It has always been customary for Parliament, when granting a railroad franchise, to prescribe quite definitely what shall be done by the company in construction, and limit the amount of capital it may raise, but to leave the companies quite free, in all matters beyond these specific requirements, to follow their sense of their own interest and the public demand. When a company has constructed its road, buildings and accessories in compliance with its charter, it has fulfilled its engagements to Parliament, so far as structural construction is concerned. Its remaining obligation is to maintain its property in good repair and to operate the road with due regard to the public interest. It cannot be compelled to invest its earnings in buying more land or erecting new and expensive structures.

Rights in Streams.—For about thirty years the Great Northern Railway Company has been accustomed, without objection being made by any one, to draw water for its locomotives from a stream known as Nunn's Brook. A few years ago the proprietor of mills located on the stream below brought a suit to forbid its doing so any longer. His complaint was that the abstraction of the water tended, in dry seasons, to diminish the amount for turning the wheels of his mill. This was probably only a pretext, for the evidence showed that the amount taken was entirely trivial; about enough in twenty-four hours to work the mill-wheel three minutes, or to reduce the stream by about one-fifth of an inch. However, the general rule of law is, wherever water-power is of value, that the successive owners on the banks of a stream have each the right to make reasonable use of the water as it flows past his premises, but not to divert the stream, exhaust it, pollute it, or otherwise render it unavailable for owners below. The mill-owner relied on this rule to obtain a decree to forbid the railroad company above him from drawing water, unless they should return it to the stream. The Court of Chancery decided against the claim; saying that the company had a right to make a reasonable use of the water, and that taking a quantity which was suitable to supply their engines, and was so small in proportion to the whole flow of the stream, was entirely reasonable. As the company owned land on the bank it had the right to derive every benefit practicable from the stream, provided, only, that enjoyment of it by owners below was not prevented.

Carriage of Merchandise.—A parcel of goods was carried over the Great Western Railway addressed to Mr. Chapman, at Wimborne, "to be left till called for." It reached Wimborne safely, and, as the company did not know Chapman's address—he was a traveling salesman—it was stored in the warehouse till he should call for it. Two days afterward the warehouse was burned, and the bundle in it. The circumstances presented, of course, the familiar question whether the company was liable as carrier or as warehouseman only. The Queen's Bench judges decided in favor of the company. A person to whom goods are sent by railroad is entitled to a reasonable time to come to the station for them. He is not expected to be at hand when the train arrives. On the other hand, he cannot prolong the special liability of the carrier beyond a reasonable time. If he is not made aware of the arrival of the goods, the responsibility for his ignorance is upon him or upon the consignor, it is not upon the company. As soon as a reasonable time for him to call and take the goods has elapsed, the liability of the company ceases to be that of a carrier and becomes that of a warehouseman; that is, it is liable only for negligence. Marking the goods "to be left till called for" makes no difference in the liability. These words amount to no more than an intimation to the company that the goods are not to be delivered elsewhere, but will be fetched from the station. They have been long in use, and had their origin in former times when carriers generally made delivery at the house or place of business of the consignee (as the railroads now do quite generally in English cities); and their purpose is to prevent the goods from being sent out for delivery and possible misdelivery, and to insure their being retained at the office in readiness for the consignee. They do not enlarge the contract of a railroad company to keep the goods upon his carrier's liability, or prolong the responsibility for an accidental loss, such as destruction by fire.

Carriage of Passengers.—According to a decision of the Queen's Bench, any power of a railroad company to make a rule requiring a passenger to show or surrender his ticket extends only to making rules such as the courts may consider to be reasonable. There were two companies which made arrangements for running trains in connection, so that passengers, by purchasing a single ticket, might travel over both roads, changing cars at a station where the two lines connected. A

rule required passengers claiming this privilege to show their tickets to a collector stationed on the platform at the transfer station; and the penalty for refusal was paying fare from the station where the train started. One passenger who refused to produce his ticket was required, under the rule, to pay this fare; and, on his refusal, was prosecuted.

But the court held that the rule exceeded the powers of the company. It was unreasonable in several respects. 1. Such a rule ought to be limited to cases where there is an intent to defraud. 2. The penalty for refusing to show the ticket would vary, under the rule, according to the length of the journey made by the train; now the fine ought to be the same for the offense no matter how far the train had come.

The Southeastern Railway Company has been accustomed to sell cheap tickets to go and return, put up in small books of coupons. On the second page of the cover of each book is printed a condition that each company in the connection incurs no responsibility for casualties to passengers occurring on the road of any other company. Then follow half a dozen pages of coupons adapted to be torn out by the successive conductors on the passenger's journey. A passenger holding such a ticket was injured, and instead of suing the company on whose road the accident occurred, he sued the one by which the ticket was sold. The defense was founded on the condition in the book. The passenger declared that he never saw that condition, and his lawyers argued that he was not bound to read his book or tickets through; that it was for the company to notify him of any stipulation desired, and it took the risk of his reading what was printed inside a ticket put up in such form. But the court held that as this was a case of a special contract—a cheap return ticket—the passenger was bound by the whole contract, cover, coupons, and all.

An eminent physician and surgeon named Phillips, was injured in a railroad disaster in such a way as to break up his practice (which was very lucrative) for at least two or three years, if not permanently. He had, however, large independent property. On the first trial of his suit for damages the jury awarded him £7,000. The courts set this verdict aside as being too small. On the second trial the jury allowed him £16,000 (\$80,000), and the company complained of this as being too large. The law question discussed was whether the interference with the practice, and the expected fees, presents and other gains which a physician believes he would have realized if it had not been for the injury is a legitimate ground for damages. The Court of Appeal has pronounced judgment that damages for this cause are allowable, and that the verdict was not, under the circumstances of the case, excessive.

The Growth of Flour Manufacture and Exports.

The grain movement has been materially modified of late by a great increase in the amount and proportion of wheat which is ground in the Northwest and forwarded in the form of flour. This is visible alike in the receipts and shipments of the Northwestern markets, the receipts of the Atlantic ports and the exports, and some statistics bearing on it will be found under the head of "Traffic and Earnings," in another column. This is a change of considerable importance to the carriers, for it reduces largely the amount of traffic afforded by the wheat crops. A barrel of flour is usually considered the equivalent of $4\frac{1}{2}$ or five bushels of wheat; it is more nearly the former than the latter. The carriers carry a barrel of flour for the same price as for 200 lbs. of wheat, when the wheat of which it is made weighs 270 lbs. Flour is more valuable than wheat, and more liable to damage, and, moreover, the actual weight of a barrel of flour is considerably more than 200 lbs. The carriers, however, do not lose the whole difference between the weight of the wheat and that of the flour, because they carry part of the bran and other "mill-stuffs" of which that difference is composed. The change is altogether a rational one, as it reduces the weight of the product to be transported from the Western wheat fields, though with the demand that exists abroad for food for animals, one would suppose that the price of "mill-stuffs" there would be sufficient to pay the freight. It must be remembered that the flour exports have not increased heretofore anything like as fast as the wheat exports. Thus from 1877 to 1878 there was an increase of 126 per cent. in wheat and of 60 per cent. in flour exports; from 1878 to 1879 an increase of 35 per cent. in wheat and 25 per cent. in flour, while from the four ports of Boston, New York, Philadelphia and Baltimore (which with Montreal export nearly all the flour that goes

from the Atlantic coast), the exports of flour and wheat in 1877 and 1879 compare as follows:

	1879.	1877.	Increase.	P.c.
Flour, bbls.	5,711,004	2,256,560	3,454,444	153.2
Wheat, bush.	117,590,891	30,412,584	87,178,307	287.4

That is, reducing to wheat, in 1877 we exported 27 per cent. of it in the form of flour; but of the 104,000,000 of increase in 1879 over 1877 we exported but 17 per cent. in the form of flour.

But passing to 1880 we see the beginning of the great increase of flour manufacture which is so striking in the movement for some weeks past. In that year there was a decrease of 6.6 per cent. in the wheat exports of these four ports, but an increase of 8.7 per cent. in their flour exports. Reducing their flour exports to wheat, we find that in 1879 19.6 per cent. of the total exports were in the form of flour, and in 1880 22.5 per cent.

The increase in milling is not likely to keep even step with the increase in production or exports, because millers are not likely to invest large amounts of capital in mills until they are satisfied that the increase is permanent, and that there will therefore be a steady market for their product, as they cannot afford to have the mills lie idle in years of light movement. The demand of the last few years has apparently satisfied them that the demand has largely and permanently increased, and induced them to increase their capacity for producing flour.

This increase in milling, moreover, has a considerable effect on traffic besides that caused by the reduction of the weight carried. To a great extent it fixes the course of shipments. The grain which before might go to the seaboard by any route whatever, now must go first to the mills and thence to the market. For instance, if there is a milling capacity of 10,000,000 bushels at Minneapolis more than formerly, these 10,000,000 bushels of wheat, or something like it, which formerly might have gone from the Red River valley directly east by way of Duluth, or from southwestern Minnesota or southeastern Dakota by the Southern Minnesota or the Chicago & Northwestern directly east to Lake Michigan, now is almost sure to go first to Minneapolis, and so can be carried further east only by the roads that reach Minneapolis; for unless milling becomes very unprofitable, the mills are bound to have wheat to grind, and if necessary will divert it from its direct route to the east in order to get it.

The railroads through the new wheat districts are generally eager to have mills established on their own lines, as then they are sure to secure for their own road the carriage of the flour as well as that of the wheat, which they are not sure of when the grain is ground at a point where several roads compete for the carriage of the flour eastward, as at Minneapolis and St. Louis. However, they very commonly do secure the flour from the wheat their own lines carry to the mills at competing points, we believe, by making rates to the millers which include both the carriage of grain to the mills and that of the flour from them. This, of course, applies only to companies which have roads east of the mills as well as west of them—such as the Chicago, Milwaukee & St. Paul and the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis.

Further, the change from wheat to flour seems to affect the destination of the freight on the Atlantic seaboard. For some reason the flour exports are much more concentrated than the wheat exports. Of the four ports named, New York and Boston have by far the larger part of the trade—in 1880 about five-sixths of the whole—and Boston has proportionally a larger share of the flour than of any grain. Montreal is a large exporter of flour, but we have not its exports for 1880, and we believe that they are chiefly the product of Canadian mills. Though Baltimore and Philadelphia, and especially Baltimore, export great quantities of wheat, so far they have exported comparatively little flour. It would then appear, if we look no further, that the more wheat we grind for export the better it is for New York and Boston, and the worse for Philadelphia and Baltimore (and we may add New Orleans, which exports very little flour, and less now than formerly). But we may not be sure of this until we know more definitely where the new mills are. Baltimore draws nearly all its wheat from the Ohio valley, and comparatively little from lake ports or places as far north as Chicago. Now if, as we suspect, there has been little or no increase in milling in the Ohio valley, the comparatively small progress of Baltimore in flour exports is sufficiently explained; should there be an increase of milling there somewhat in proportion to the great increase of wheat production of late years, perhaps Baltimore would get the most of it, as it has of the wheat.

We have not now any other clew to the location of

the new mills than is furnished by the fact that there has been a large addition at Minneapolis, and in 1880 very little, if any, increase in the production of St. Louis (these two being the two largest milling centres), and the statistics which show that there has been a large increase in the flour receipts of the Northwestern markets (all lake ports except St. Louis and Peoria) as well as in the receipts and exports of the Atlantic ports.

It will be well to remember this recent large increase in flour production in studying reports of grain movement which do not include flour, like most of those which we publish.

A Standard Unit of Locomotive Power.

Mr. R. Abt has contributed to the Swiss journal *Die Eisenbahn* a long and carefully studied paper on this subject. He says that the amount of work that a stationary engine, of any description, is capable of doing is generally expressed as so many horse-power. By this unit is understood such a power as when applied will suffice to raise 33,000 lbs. one foot in vertical height in one minute.

With a locomotive it is different. Theoretically, it is sought to express in horse-powers the work performed by a locomotive, but practically, and especially in the railroad service, there are a number of other standards that are more easily available. The technical expert prefers to employ "tractive power," i. e., that power exerted at the periphery of the driving-wheels and employed in overcoming any obstacles opposed to the progress of the locomotive. The amount of this tractive power depends:

First, on the power of the steam engine *per se*.

Second, on the extent of the adhesive weight; and it may therefore be considered with reference to its application to any locomotive by two methods. The first presumes that the adhesive weight and state of the rails is analogous to the power of the machine, and, in calculating the tractive force by this method, it is only necessary to consider the motor and the driving-wheels according to the usual formula. The other method determines the tractive force exclusive of the available adhesive weight and its co-efficients, without reference to the power of the engine. According to the calculations arrived at by both methods, the tractive force of a well constructed locomotive should amount to from one-fifth to one-seventh of the total of the co-efficients of the adhesive force, so that either method may be accepted as correct. But according to these calculations, the tractive force of a locomotive having a certain adhesive weight is equal to that of any other of like proportions. But it must be evident that tractive power can only be taken as a reliable standard for a comparison between two locomotives so long as they traverse a similar distance in a given unit of time, i. e., so long as their speed is equal. When we have two engines of similar tractive power, the one of which travels two yards in a second while the other covers a distance of ten yards in the same time, the latter is doing manifestly five times as much work as the former; or, in other words, is five times as powerful. We cannot, therefore, take tractive force alone as a standard of comparison for locomotives.

Some statisticians take into consideration the number of axles on which the adhesive weight falls, calculating that the weight on the axles is about equal on all standard railroads.

Others include the total weight of the machine in their calculations, without considering whether the weight is wholly or only partially available adhesive weight. The Austro-Hungarian railroad reports have, until lately, given the work done by their locomotives in horse-powers, calculating at the rate of one horse-power to each 5.5 square feet (Austrian measure) of heating surface to the boiler; but they fail to consider the construction of the boiler, the proportions of direct and indirect heating surface, grate surface, quality of fuel, steam pressure, etc. The operating officials concern themselves much less about the allotted power of the locomotive than the work actually performed, and are chiefly to blame for the fact that to-day, mixed up with the power of a locomotive and included with it, we find now power, now distance, now speed, and only in few cases genuine mechanical "work performed."

From such calculations are compiled the railroad reports, and to the above factors they attach statements as to consumption of fuel and lubricators, cost of repairs etc. These results, as applied to one class of locomotive, are recklessly compared with those of a former year's performance, or perhaps with another machine running possibly on a different road and under totally different conditions. To like calculations we are indebted for such statistics as the following: "The locomotives of the A. Railroad used last year 7.5 kilograms of coal per engine-kilometer, this year only 7 kilograms—the conditions of firing and service are therefore improved—or the trains lighter. Again, "a six-driving-wheel locomotive on the A. Railroad travels annually 28,000 kilometers; a similarly constructed machine on the B. road only 21,000. The first engine is therefore more profitably used than the second." The report does not mention the facts that the rate of travel on the A. road is 35 kilometers, on the B. road only 25; the tractive force kilometer is distributed over 32 axle-kilometers on the A. road, while there are only 20 on the B. road; the maximum grade on the one is 2.5 per cent., on the other 1.2 per cent., etc.

These facts will suffice to prove that the standards adopted at the present time for the comparison of the capacity of locomotives, whether technical or purely commercial, almost

always lead to doubtful and erroneous results. It is an evil that is thoroughly recognized but not easy of correction.

In order to correct these errors, says Mr. Abt, it is first absolutely necessary that we adhere strictly to the scientific meaning of the expression "work performed" and understand it simply as "mechanical" work. It will at first appear that we have only to express the power of the locomotive as an independent machine in "horse-powers." But this unit has, up to the present time, been found impracticable of adoption, either in the operation of the railroad or construction of the locomotive. The cause is probably to be found in the fact that the factors which make up the unit of power are in very different proportions to the standards of comparison now employed in railroad work and necessitate, in every case, a tedious reduction of factors. The elements or factors with which railroad officials are familiar are: the hour as a unit of time, the kilometer as a unit of distance and the ton as a unit of power. A standard of labor performed, with these units as factors, could be made as correct theoretically as a standard having its expression in horse-power, while it would possess the advantage of obviating the reduction of factors. It could be expressed as "locomotive power" and could be understood as the mechanical force that a locomotive would expend in exercising during one hour a constant tractive force of one ton and during the time covering a distance of one kilometer, or, in other words, the mechanical power which is necessary to overcome for one hour and in the distance of one kilometer a resistance of one ton.

As the distance is therefore reckoned always in hours, we shall find that the product of the tractive force expressed in the speed in kilometers gives the number of horse-powers of a locomotive.

$$\text{A locomotive power} = \frac{1,000 \times 1,000}{75 \times 3,600} = \frac{100}{27}$$

or, 27 locomotive powers = 100 horse-power.

Mr. Abt gives the following as an example: The express locomotives of the Central Swiss Railroad possess a medium



tractive power of 2.1 tons, and exercising that power are capable of sustaining a speed of 30 kilometers an hour. Their performance therefore equals $2.1 \times 30 = 63$ locomotive powers, or 233 horse-power.

This new standard unit of measurement, he says, would recommend itself to locomotive-builders as helping them in ascertaining the proportions of well-constructed machines.

They would be able to determine, for instance, how many locomotive powers should be developed from

- 1,000 francs of cost of construction; or,
- 1 driving-axle,
- 1 square meter grate surface,
- 1 " " direct heating surface,
- 1 " " indirect heating surface,
- 1 " " total " "
- 1 ton gross weight,
- 1 " adhesive weight.

In addition to the above, there were other factors that had to be taken into consideration. In the railroads on which the experiments were tried on which these calculations were based, there was allowed for resistance on up grades, one kilogramme per thousand. The sum of all other resistance was reckoned at eight kilogrammes per ton of the weight of the locomotive and tender, and four kilogrammes per ton on the weight of the cars.

It is greatly desired that on the railroads of every country some arrangements could be arrived at whereby the resistance to be overcome in the rolling stock, as well as the tractive force of the locomotives, could be ascertained. The Swiss law that is to come in force in 1883 provides that on all railroads above a certain length an apparatus shall be attached to all trains, whereby the highest rate of speed may be ascertained and regulated.

We need hardly remark that by tractive power Abt refers in every case to the power developed at the periphery of the driving-wheel, and not that at the couplings. It must be understood that the locomotive does not carry itself gratis, as far as the expenditure of power is concerned, and the omission of such an item as the power exhausted by the locomotive in moving itself is apt to change the tenor of the report of such a railroad. For instance, on the Rigi Railroad, 60 to 70 per cent. of the power developed by the locomotive is expended in transporting itself. It hauls but one or two cars up the mountain, which, with their load, weighs much less than the engine.

Pennsylvania Railroad Earnings and Expenses.

Pennsylvania Railroad earnings in December show an increase of but 2.7 per cent. over those of December, 1879, and have been cited as evidence of a decline in railroad earnings in the country. This comes of considering only the two months, without reference to the general course of earnings of the road. The fact is that in 1879 the December earnings were extraordinary, exceeded but in one month (October) of the whole year 1879, and in no month whatever before since the earnings were so greatly swelled by the Centennial traffic in the fall of 1876. In 1880 the earnings were smaller in December than in any of the other months since July; but certainly no sane man could expect the enormous receipts of the busiest month of the busiest year on record to continue uninterrupted through the winter. The December earnings of the road (all east of Pittsburgh and Erie) for five successive years have been:

1876.	1877.	1878.	1879.	1880.
\$3,082,567	\$2,841,392	\$2,605,297	\$3,453,924	\$3,547,827

so that, though the earnings in 1880 were but 2.7 per cent. more than in 1879, they were 36 per cent. more than in 1878, 25 per cent. more than in 1877, and 15 per cent. more than in 1876.

Moreover, disappointment is expressed because of the enormous increase of nearly \$480,000, or nearly 25 per cent., in expenses, which caused a decrease of 25½ per cent. in the net earnings. But it ought to have been known by this time that the declared policy of the company is at this time of great earnings to make great improvements of the property without at this time increasing its obligations. That is, part of the money charged to expenses has really gone into additions to the stockholders' property, which we may be sure are calculated to make profits larger hereafter. The December expenses and net earnings for five years have been:

1876.	1877.	1878.	1879.	1880.
Expenses, \$1,710,408	\$1,641,788	\$1,673,362	\$1,941,870	\$2,421,575
Net earnings, 1,372,159	1,199,604	931,934	1,512,054	1,126,252

The expenses, therefore, are so very much greater than in any previous year that the increase cannot have been caused simply by the growth in traffic. The net earnings are not only 25½ per cent. less than in 1879, but a little (6 per cent.) less than in 1877, and 18 per cent. less than in 1876.

Expenses and net earnings per month, however, are not very definite expressions. Expenditures for maintenance have to be made when it is most convenient, and of course no attempt is made to have the maintenance work and expenditures of any one month in proportion to the wear and depreciation of that month. This should be borne in mind in considering all statements of monthly expenses. For the year, we may claim that the property should, as near as may be, be in as good condition at its end as at its beginning, and the statement of the earnings, expenses and net earnings of the Pennsylvania Railroad for the past five years is much more conclusive evidence of the condition and course of the enterprise:

Year.	Gross earnings.	Expenses.	Net earnings.
1876.....	\$36,891,061	\$22,081,229	\$14,809,832
1877.....	31,117,146	19,028,467	12,088,679
1878.....	31,636,734	18,468,993	13,167,741
1879.....	34,620,279	20,382,740	14,237,539
1880.....	41,260,072	24,625,047	16,635,025

Those who are dissatisfied with the December statement ought to be pleased with this. Notwithstanding an increase of more than four millions in the expenses over 1879, there was an increase of \$2,400,000 in the net earnings, which is equivalent to more than 3½ per cent. on the stock. Moreover, the leased lines west of Pittsburgh and Erie show an increase in the surplus of net earnings over rentals and other liabilities equal to \$1,422,870, so that the Pennsylvania Railroad Company's profit is about \$3,800,000 larger than in 1879, which is 5½ per cent. on the stock.

"Standard Time."

The article under this title which we published last week referred to a cut of a clock face, which the reader looked for in vain. Those who were interested in the subject we beg to refer to the article again in connection with the accompanying cut, which, however, will explain itself pretty well.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Gulf, Colorado & Santa Fe.—Extended from Rogers, Tex., west by north to the Leon River, 15 miles.

Keokuk & Northwestern.—Extended from Salem, Ia., north to Fairfield, 9 miles.

This is a total of 24 miles of new railroad, making 71 miles reported for 1881. The weather thus far this year has been extremely unfavorable for track laying.

FOREIGN IMMIGRATION, according to the report of the Bureau of Statistics, was more than twice as great in 1880 as in 1879, and greater than ever before. The largest numbers of yearly arrivals have been 427,833 in 1854, 404,506 in 1872, 459,803 in 1873, and 586,068 in 1880. The latter number exceeds the aggregate arrivals of the three years previous. However, the larger immigration of 1880 had comparatively much less effect than that of 1854, and probably no more than that of 1872 and 1873, for the reason that it was distributed among a larger population. In 1854 the immigration was at the rate of an addition of 13.2 people to every thousand of the population, in 1880 it was equivalent to an addition of but 11.8 to every thousand; and we may add that in 1854 the immigration was at the rate of 256 per mile of railroad in the country; in 1880 to 63 per mile.

Thus the average amount of benefit to the railroads of the country from the immigration is very much less than in 1854. However, the immigration itself—the mere carrying of the immigrants—to a few roads brings a very large amount of traffic. By far the larger number of immigrants land at New York and are carried westward by the trunk lines. Now the carriage of even half of last year's immigrants gives a daily traffic of no less than 233 passengers per day. Further, these passengers arrive by steamers in great masses, so that they can be carried in trains about as large as the engines can haul, so that at very low rates great earnings per train-mile and very good profits may be had—as from almost any passenger traffic which can be carried in great train-loads; though in the case of the immigrants there is the very serious drawback that the trains return empty. This is a traffic worth struggling for—and the railroads have struggled for it and so hard that we may say that they have been fighting over it nearly ever since it has been worth having, with the result that they have made it worth little or nothing, carried the immigrants for a trifle—which is not particularly lamentable—and distributed a large portion of the earnings from the traffic in the form of commissions, etc., to pay for getting the traffic away from each other. With the present prosperous condition of this country and the less prosperous, not to say unprosperous, times abroad, we may expect a large immigration in 1881 also, and it is much to be desired that if the immigrants be carried by the railroads at cost or less, the railroad companies, and not a crowd of useless agents, who torture and not help the immigrants, should get what little they do pay. Apparently there has been no difference between the trunk lines for three or four years which it has been so hard to settle. The recent "cuts" are to such very low figures (\$6.50 from New York to Chicago) that they may have the effect of bringing about an agreement.

WALL STREET OPERATORS are credited with extraordinary ignorance by some of the newspapers which attempt to account for the fluctuations in the prices at which they buy and sell stocks. Recently a decline in the "Granger" stocks was said to be caused, or partly so, by reports of a bad condition of the winter wheat crop. Now the stocks known as the "Grangers" are those of the road extending west and northwest of the Chicago—more particularly the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul. In all the country reached by these roads winter wheat is scarcely grown at all—not enough to affect the traffic or earnings of the roads to any extent worth mentioning, especially as, if the fall-sown grain turns out in the spring to be winter-killed, the land will have some other crop put on it, and will very likely yield just as much traffic as if the winter wheat should prove a full crop. The Granger roads get a very large amount of traffic from wheat, it is true; but the fields which will afford them freight after next harvest are yet to be sown, and should the winter wheat in the country be very badly winter-killed, it will be a good thing for these roads, because it will stimulate the sowing of spring wheat on their lines and make the crop of that grain more profitable. Winter wheat is grown very largely in Michigan and Ohio, but further west very little is produced north of the latitude of Peoria in Illinois and north of Missouri and Kansas. South of that line, winter wheat is grown much more than spring, and for a few years past it has been the leading crop and has been so productive as to make the farmers more prosperous than for a long time before. There have been reports of great injury to this crop this winter in southern Ohio, Indiana and Illinois, but we have not heard that the price of any stock has been affected by these reports. On the contrary, a report from the Illinois Department of Agriculture says that in that state the wheat is in average good condition. Should the wheat be very badly winter-killed there, it will be plowed up in the spring, and most of the ground occupied by it will doubtless be planted to corn, which is the surest crop in that district, and almost always very productive. This will afford more freight than wheat, but not bring in as much profit to the farmer as the wheat crops of late years. But the effect of this will probably be to cause more spring wheat and less corn to be cultivated further north. Thus a disaster to a winter crop that occurs before spring is comparatively a slight one to the country. The farmer loses his labor and his seed, but may raise a full crop of spring grain.

PETROLEUM EXPORTS in 1880 were 14½ per cent. less than in 1879 and 1½ per cent. less than in 1877. This decrease is in a staple which before 1877 had increased with great rapidity (240,000,000 gallons in 1875, 256,000,000 in 1876, and 355,000,000 in 1877). We have seen no adequate explanation of the decrease in 1880. Prices were not high, and it is not at all probable that the limit of the demand of this cheapest and most effective of illuminators has been reached abroad, where so lately it was unknown. The exports of 1880, however, were by no means small, amounting to 350,000,000 gallons, which weigh 1,165,000 tons, which is more than the weight of our cotton exports ever have been, and is equivalent to that of 39,000,000 bushels of wheat. Petroleum, however, is a much less important export than either wheat or cotton. It bears a small price, not as much per pound as wheat, and not a fifth as much as cotton. Another development of the past year has been the greater concentration of the export trade at New York. In 1876 New York exported 56.7 per cent. of the whole, in 1879 71.1 per cent., in 1880 75.9. Philadelphia has but once in six years exported so little, and the quantity is nearly a third less than in 1879; and Baltimore seems to be going out of the business entirely. The

progress of the trade there has been quite remarkable. It was late before it got any noticeable share of the exports; but when the Pittsburgh & Connellsville road was able to carry from Pittsburgh freely, a large business soon grew up there. In 1875 Baltimore exported about 25,000,000 gallons, and by 1877 this grew to be 45,000,000. But this was the culmination, and since, there has been a great decline, until in 1880 its exports were but 15,000,000, or but one-third of the 1877 exports. Boston shows much larger exports in 1880 than ever before, but still they are not 3 per cent. of the whole. It should be said that there was a recovery in the exports in the month of December, so that for the last five weeks of the year they were a trifle greater than in the corresponding weeks of 1879, or of any previous year, and in that month the proportion of Philadelphia (but not of Baltimore) was much greater than before for some time.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Missouri Pacific, annual meeting, at the office in St. Louis, March 1, at 9 a. m. Transfer-books will close Jan. 31.
Scioto Valley, annual meeting, at the office in Columbus, O., Feb. 10, at 3 p. m.
Delaware, Lackawanna & Western, annual meeting, at the office, 26 Exchange Place, New York, Feb. 23, at 10 a. m. Transfer books close Feb. 3.

Dividends.

Dividends have been declared as follows:
New York, Providence & Boston, 2 per cent., quarterly, payable Feb. 10.
Columbus & Hocking Valley, 4 per cent., semi-annual, payable Feb. 10.
Central Ohio (leased to Baltimore & Ohio), 3½ per cent. on common and 3 per cent. on preferred stock, semi-annual, payable Jan. 31.
Midletown, Unionville & Water Gap (leased to Midland, of New Jersey), 2½ per cent., payable on demand. This makes 6 per cent. for the year.
Pullman Palace Car Co., 2 per cent., quarterly, payable Feb. 15.
Kansas City, Ft. Scott & Gulf, 4½ per cent. from the earnings of 1880, to holders of contracts for preferred stock, payable Feb. 15. This makes 8 per cent. for the year on the preferred stock, which represents the former bonded debt.
Chicago & West Michigan, 2½ per cent., payable Feb. 15. This is the first dividend; the stock represents the former bonds.
North Carolina (leased to Richmond & Danville), 6 per cent., yearly, one-half payable March 1 and one-half Sept. 1.
St. Louis, Alton & Terre Haute, 3 per cent. on the preferred stock, payable Feb. 19. This is the first dividend for a long time.

Western Association, General Passenger & Ticket Agents.

The following call has been issued by Mr. George H. Daniels, Secretary of this Association:
 "The next regular meeting of this Association will be held at the Grand Hotel, Cincinnati, on Wednesday, Feb. 9, 1881, at 11 o'clock a. m. The Executive Committee present the following subjects for discussion:
 "1. Uniformity in the color or tints of coupon tickets. Why cannot the members of this Association, one and all, adopt uniform colors or tints?
 "2. Is it not feasible, and of great utility and convenience, to give the actual numbers of the trains on our folders and in the *Official Railway Guide*, instead of calling all trains 'Fast Express'?
 "3. What is the best plan for running local excursions—to rent coaches, or to make reasonable rates, sell our own tickets and abandon the 'Renting Out' plan.
 "4. Do all members of this Association give on their ticket report to foreign lines the through rate, commencing and closing, or consecutive numbers of tickets; also, the actual name of station where tickets are sold, as well as the destination, form and division.
 "5. What is the best mode of doing a round-trip local ticket business—to make a 10 or 15 per cent. discount on the double rates, and limit the tickets to a few days, or no limit?
 "6. Is it not a wise plan to pay our own ticket agents a commission on local ticket sales, thereby stimulating them to see that all passengers are ticketed?
 "7. In making a through rate between any two given points, from one part of the country to another, over two or more roads, why should not such rate be made by adding together the amounts of local ticket rates, which, when combined, make the smallest amount between the two points, from the fact that a passenger can pass between the two points for such combined amount.
 "8. Will each road in this Association devote a certain space in the *Official Railway Guide*, on their time table page or pages, to give information regarding through cars, from and to what points they run, and on what trains? For example, see advertisements of Chicago, Burlington & Quincy and Vandalia in *Official Guide*.
 "9. Are there any roads in this Association that, in reporting excess baggage collections to foreign lines, do not include the same on their foreign ticket report? If not, does the passenger department of the line reported to get credit, or does such item go into a miscellaneous account?
 "10. Why, if the expense of running and keeping up United States mail and express cars be charged to the passenger department service, should not the earnings on same be credited to the passenger department?
 "11. Members are requested to come prepared to vote on the following questions regarding the issue of free transportation to editors of newspapers, in consideration of standing advertisements in said papers, viz.:
 "First. Regular annual passes, good over all the lines of the roads issuing them.
 "Second. Regular annual passes, good only on the division of the road on which the editor lives.
 "Third. Trip transportation, in coupon book form.
 "Fourth. 1,000 and 500 mile tickets.
 "Fifth. If annual passes are used, should they be provided with the photograph of the holder?
 "12. Regarding newspaper advertising, members will be asked to consult the following:
 "First. The minimum circulation a weekly paper shall have to warrant the roads in interest making an advertising contract with it.
 "Second. Shall members of the Association make standing advertising contracts with papers off their own lines?

"Third. How old shall a paper be before an advertising contract is made with it?
 "Fourth. Shall free transportation of any kind be given to newspaper men, unless the roads giving it have a regular contract for advertising with the paper to which the applicant for the pass belongs?
 "Fifth. To prepare uniform proposition and contract blanks for newspaper contracts.
 "Sixth. Shall free transportation be furnished to any alleged newspaper correspondents or reporters (alleging to be exclusively so engaged or not), or shall the free transportation be confined exclusively to editors?
 "Seventh. Shall free transportation be furnished to editors, unless they are exclusively engaged upon their papers, and have no other business?
 "13. Some uniform system for conducting the theatrical business.
 "14. Uniformity in the issue of excess baggage tickets.
 "15. The best manner for arranging rates and tickets for the clergy.
 "16. Such other subjects as may properly come before the meeting.
 "In accordance with the provisions of the constitution, the annual election of officers will occur at this meeting, and this fact, in connection with the important subjects for discussion, should be sufficient to secure a very full attendance of the members of the Association."

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—Mr. Charles B. Wallace is appointed Superintendent, to date from Jan. 25.

Burlington, Cedar Rapids & Northern.—Mr. Theodore Stickney has been appointed Purchasing Agent. He has been for some time chief clerk of the locomotive department.

Burlington, Monmouth & Illinois River.—At the recent annual meeting the following officers were chosen: President, William Hanna; Vice-President, H. M. Lewis; Secretary, D. P. Phelps; Treasurer, J. T. Reichard; directors, W. O. Cadwallader, Mills Lewis, J. T. Reichard, Samuel McFarland. It is reported that the Wabash has secured control of the company.

Chicago & West Michigan.—The jurisdiction of General Manager George C. Kimball and General Freight and Passenger Agent A. M. Nichols is extended over the recently acquired Grand Haven and Grand Rapids, Newaygo & Lake Shore roads. Mr. A. M. Nichols is appointed Assistant General Superintendent, in addition to his other duties. For the present Mr. Fred H. May remains Superintendent of the Grand Haven road, and Mr. C. Warner Superintendent of the Grand Rapids, Newaygo & Lake Shore.

Cincinnati Central.—The officers of this new company are: Theodore Cook, President; Robert Simpson, Vice-President; W. Thrall, Secretary and Treasurer.

Des Moines & St. Louis.—The officers of this new company are: President, J. S. Clarkson; Vice-President, John S. Runnels; Secretary, F. M. Hubbell; Treasurer, J. S. Polk. Office at Des Moines, Ia.

East Tennessee, Virginia & Georgia.—The following circular has been issued by General Superintendent John F. O'Brien:

"Mr. J. B. Hoxsie has been appointed Inspector of Transportation of the consolidated line from Bristol to Selma.

"Major Frank K. Huger has been appointed Master of Transportation of the main stem.

"Communications in regard to transportation on the main stem should be addressed to Major Huger at Knoxville. Communications in reference to car balances, improper use and loading of cars, detention of same, and kindred matters on either main stem or Selma Division, should be addressed to Mr. Hoxsie."

Elizabethtown, Lexington & Big Sandy.—John D. Yarrington is appointed Master of Trains of the Eastern Division, with office at Ashland, Ky. He is invested with authority of Division Superintendent.

Evansville, Seymour & Bellefontaine.—The directors of this company are now as follows: A. W. Carpenter, Evansville, Ind.; H. C. Kimble, Brookville, Ind.; C. B. Cole, E. C. Devroe, Seymour, Ind.; J. N. McBeets, Chicago; M. Peters, Philadelphia; H. B. Hammond, C. W. Kohlsatt, New York. The board has elected Robert Pattison Secretary and Treasurer.

Fl. Wayne & Jackson.—At the annual meeting in Jackson, Mich., Jan. 29, the following directors were chosen: Wm. E. Dodge, Wm. H. Hayes, James F. Joy, Roswell G. Rolston, Amos Root, Samuel Sloan, Moses Taylor.

Greeley, Salt Lake & Denver.—The directors of this new company are: John J. Bush, Sidney Dillon, A. A. Egbert, John Evans, C. W. Fisher, Jay Gould, Willard Teller. Office in Denver, Col.

Huntington & Broad Top Mountain.—At the annual meeting in Philadelphia, Feb. 1, the following were chosen: President, B. Andrews Knight; directors, John Devereux, Samuel Field, Wm. P. Jenks, James Long, Daniel J. Morrell, Jacob Naylor, Thomas R. Patton, Joseph H. Trotter, C. W. Wharton, James Whittaker, I. V. Williamson, Rathmell Wilson.

Illinois & St. Louis.—At the annual meeting in Belleville, Ill., Jan. 20, the following directors were chosen: J. W. Branch, Ralph Seller, Adolphus Meier, John D. Perry, Geo. Knapp, Greeley, Hugh Campbell, G. A. Koerner, B. F. Switzer, Russell Hindly, J. Rainy, A. C. Huckle, J. B. Renchler, W. E. Richardson, Thos. Winstanly. The board elected J. W. Branch President; Adolphus Meier, Vice-President; P. T. Burke, Secretary; C. H. Sharman, General Superintendent and Treasurer.

Indianapolis & St. Louis.—Mr. Charles A. Allen has been appointed to the position of Train-Master of Eastern Division, with office in Indianapolis. He held the position until a few weeks ago, and is now re-appointed. As noted last week, Mr. Thomas Hume is appointed Train-Master of the Western Division, with office at Mattoon, Ill. The office of Master of Transportation is abolished.

Mr. Robert Marks is appointed Road-Master, with office at Mattoon.

Kentucky Central.—At the annual meeting in Covington, Ky., Jan. 25, the following directors were chosen: M. E. Ingalls, J. N. Kinney, William Ernst, Henry Lewis, S. J. Broadwell, E. H. Pendleton and Charlton Alexander. The new board elected officers as follows: President, M. E. Ingalls; Vice-President, E. H. Pendleton; Secretary, C. H. Bronson; Treasurer, R. B. Fowler; General Manager, J. D. Ellison. Messrs. Ingalls, Kinney, Lewis and Broadwell are new directors, succeeding R. B. Bowler, George H. Pendleton, J. W. Stevenson and Peter Zinn. Mr. Ingalls succeeds Wm. Ernst as President; Mr. Bowler, the new Treasurer, was formerly General Manager, and as Treasurer succeeds E. H. Pendleton; the Vice-President and Secretary are re-

electd. Mr. Ellison, the new General Manager, has been for several years Superintendent of the Little Miami road.

Lake Huron Shore.—This company has been organized with the following directors: W. H. Potter, A. W. Comstock, George L. Maltz, Alpena, Mich.; T. Collins, R. Z. Roberts, Alpena County, Mich.; F. Beard, E. F. Holmes, B. F. Smith, Iosco County, Mich.; H. P. Merritt, Bay County, Mich. The board elected W. H. Potter, President; George L. Maltz, Secretary; A. W. Comstock, Treasurer. Office in Alpena, Mich.

Little Miami.—At the annual meeting in Columbus, O., recently, the following directors were chosen: A. D. Bullock, C. P. Cassilly, W. H. Clement, Julius Dexter, Henry Hanna, L. B. Harrison, H. J. Jewett, Joseph Longworth, Thomas D. Messler, Joseph H. Rogers, Joseph R. Swan, Louis Ballauf. Mr. Ballauf is a new member. The board re-elected the old officers as follows: H. J. Jewett, President; Henry Hanna, Vice-President; Julius Dexter, Secretary; and S. E. Wright, Treasurer. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

Longview & Sabine Valley.—At the annual meeting in Longview, Tex., the following directors were chosen: Brad Barner, S. N. Barner, Samuel Cundiff, George D. Harrison, R. B. Levy, John H. McCauley, T. S. S. Young. The board elected Brad Barner, President; George D. Harrison, Vice-President; S. N. Barner, Secretary and Treasurer.

Michigan Central.—Mr. G. W. Babbitt is appointed Train Master of the Eastern Division, with headquarters at Detroit. Mr. H. D. Donnell has been appointed Chief Train-Dispatcher at Jackson in place of Mr. Babbitt, promoted.

New Mexico & Rio Grande.—The directors of this new company are: Theodore F. Brown, B. S. Knowlton, J. W. Riggs, F. A. Robertson, A. P. W. Skinner. Office in Denver, Col.

New York, Ontario & Western.—Mr. James E. Childs has been appointed General Superintendent, a new office on this road, the division superintendents having heretofore reported directly to the General Manager. Mr. Childs has been for several years Engineer and Superintendent of the Rochester & State Line road.

Peoria & Pekin Union.—The appointment of Mr. Robert Stewart, formerly of the Metropolitan Elevated road, as General Manager, is not of the Peoria, Pekin & Jacksonville, as erroneously stated last week, but of this company, which is an organization formed by mutual agreement by the Wabash, St. Louis & Pacific, the Indiana, Bloomington & Western, the Peoria, Decatur & Evansville, the Peoria, Pekin & Jacksonville and the Peoria & Springfield companies, for the purpose of taking charge of and managing the tracks between Peoria and Pekin and the yards in those cities.

Providence, Warren & Bristol.—At the annual meeting in Providence, Jan. 31, the following directors were chosen: Ambrose E. Burnside, Samuel W. Church, T. P. I. Goddard, Wm. Goddard, Wm. Robeson, Francis W. Weld, Henry A. Whitney. The road is controlled by the Boston & Providence.

Sedalia, Warsaw & Southern.—Mr. G. A. Huntington has been appointed General Freight and Passenger Agent, with office at Sedalia, Mo.

Shepaug.—Mr. Edwin McNeill has been appointed Superintendent and General Freight and Passenger Agent, with office in Litchfield, Conn., in place of C. H. Platt, resigned.

Southwestern Railway Association.—Mr. George W. Lilley has been appointed General Agent at Kansas City, in place of George L. Carman, resigned. Mr. Lilley was recently on the Missouri, Kansas & Texas.

Springfield & New London.—The following directors were chosen at the annual meeting in Springfield, Mass., Jan. 26: J. H. Appleton, H. J. Beebe, Wm. Birnie, E. P. Chapin, C. O. Chapin, E. D. Covert, Henry Fuller, Jr., Joseph Kirkham, M. P. Knowlton, E. D. Metcalf, Virgil Perkins, Horace Smith, J. M. Stebbins. The new board has elected Charles O. Chapin, President; C. L. Covell, Vice-President; James Kirkham, Treasurer. The road is worked by the New York & New England.

Traveling Auditors' Association.—At its first annual meeting in Cleveland, O., Jan. 19, the following officers were chosen: President, C. P. Leland, Lake Shore & Michigan Southern; Vice-President, R. S. Lukenbill, Louisville & Nashville; Secretary, G. W. Lishawa, Cincinnati, Hamilton & Dayton; Treasurer, W. M. Adams, Illinois Central.

Virginia Midland.—The following directors were chosen for this company (successor to the Washington City, Virginia Midland & Great Southern) at a meeting held in Alexandria, Feb. 1: C. G. Holland, Danville, Va.; Charles M. Blackford, Lynchburg, Va.; R. A. Coghill, Amherst County, Va.; Wm. H. Payne, Fauquier County, Va.; John T. Lovell, Warrenton, Va.; John W. Burke, Alexandria, Va.; Robert T. Baldwin, J. Wilcox Brown, John K. Cowan, Wm. F. Ferick, Robert Garrett, F. M. Keyser, Osman Latrobe, James Sloan, Jr., Baltimore.

Wabash, St. Louis & Pacific.—Mr. James F. How, Secretary of the company, is appointed Acting General Manager during the absence of Mr. John C. Gault.

Mr. A. C. Bird is appointed Superintendent of Freight Traffic, and will have special charge of all through and competitive business. Mr. Milton Knight is appointed General Freight agent, to succeed Mr. Bird.

Washington & Chesapeake.—The directors of this new company are: Wm. L. S. Townsend, Anne Arundel County, Md.; R. S. Bryan, Dorchester County, Md.; Frederick Koons, Woodbury Wheeler, Prince George County, Md.; Thomas L. Moore, Fauquier County, Va.; J. L. Husband, Philadelphia; David L. Morrison, Wm. F. Holtzman, Washington.

Washington City & Point Lookout.—Mr. R. B. Chunn is Engineer in charge of construction on this road.

Waynesburg & Washington.—Miss Belle Braden has been chosen Treasurer of this company. She is probably the only lady in the United States who is an officer of a railroad company.

Worcester & Nashua.—Mr. C. S. Turner has been chosen President and General Manager. He has been Superintendent for a number of years. Mr. G. W. Hurlburt has been appointed Superintendent. Office in Worcester, Mass.

PERSONAL.

—Mr. John C. Gault, General Manager of the Wabash, St. Louis & Pacific road, has received leave of absence, and has gone to Florida for the benefit of his health.

—Mr. John Collinson has been presented with a handsome silver centre-piece by the English holders of Atlantic, Mississippi & Ohio bonds, as a testimonial of their appreciation of his labors as their agent and representative.

—Mr. Henry G. Wood, whose appointment as General Freight and Passenger Agent of the Cairo & St. Louis road was noted last week, was recently on the Chicago, St. Paul, Minneapolis & Omaha line, and formerly on the Long Island road.

—Mr. J. M. Stinson, for over 20 years General Baggage Agent of the Illinois Central and Michigan Central roads, died in Chicago, Jan. 25, aged 50 years. He was highly respected as a faithful and efficient officer and an upright man.

—W. S. Nell, who died in Selma, Ala., on Jan. 15, in his seventy-eighth year, was, according to the Selma Argus, the first railroad conductor in this country. His first service was on the South Carolina Railroad. He was temperate almost to asceticism. He never touched tobacco in any form, tasted coffee or tea, nor drank a drop of spirituous, vinous or malt liquors until on his deathbed.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Month of January:	1881.	1880.	Inc. or Dec.	P. c.
Denver & R. G.	\$307,476	\$124,893	I.	182.583
Northern Pacific	109,805	81,593	I.	28.212

Second week in January:	1881.	1880.	Inc. or Dec.	P. c.
Gal., Har. & San Antonio	\$34,657	\$27,421	I.	7.236
Min. & St. Louis	11,959	9,814	I.	1.245

Third week in January:	1881.	1880.	Inc. or Dec.	P. c.
Chi. & Eastern Ill.	\$29,397	\$19,812	I.	80.585
Chi. Mil. & St. Paul	219,000	169,404	I.	40.596
Chi. & Alton	123,691	132,390	D.	8.639
Hanibal & St. Jo.	35,079	36,297	D.	4.218
Louisville & Nash.	189,632	151,700	I.	28.932
N.Y. & New England	42,506	37,899	I.	4.607
St. L. Iron Mt. & So.	1,73,500	154,082	D.	582
St. L. & San Fran.	43,949	46,870	D.	2.921

Week ending Jan. 21:	1881.	1880.	Inc. or Dec.	P. c.
Great Western	\$91,075	\$86,148	I.	4.927

Week ending Jan. 22:	1881.	1880.	Inc. or Dec.	P. c.
Grand Trunk	\$190,877	\$177,605	I.	13.272

Coal Movement.

Coal tonnages are reported as follows for the week ending Jan. 22:

	1881.	1880.	Inc. or Dec.	P. c.
Anthracite	538,434	417,380	I.	121.054
Semi-bituminous	59,295	81,978	D.	22.773
Bituminous, Penna.	50,677	.....	.....	.....
Coke, Penna.	47,620	.....	.....	.....

No change in list prices of anthracite is to be made for February. Trade continues good with a steady demand. In semi-bituminous Cumberland shipments for the week were very light; Clearfield are better but still below last year.

Coal carried over the Seattle & Walla Walla road and shipped by sea from Seattle, Washington Territory, in December was 13,026 tons. For the year shipments were: 1880, 198,497; 1879, 132,293; 1878, 128,582; increase last year over 1879 was 6,234 tons, or 4.7 per cent.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for January was as follows:

	1881.	1880.	Inc. or Dec.	P. c.
South Amboy for shipment	42,034	37,107	I.	4.927
Local distribution on N. J. lines	56,098	35,214	I.	20.884
Co.'s use on N. J. lines	9,235	9,640	D.	4.05
Total	107,367	81,961	I.	25.406

Of the total this year 83,242 tons were from the Lehigh, and 24,125 tons from the Wyoming Region.

The coal trade of Kansas City is growing in importance. The sources of supply have been increased by the opening up of new mines in Bates County, Mo., now made accessible by branches of the Missouri Pacific and the Kansas City, Ft. Scott & Gulf roads. The receipts, all bituminous, for the year ending Dec. 31 were: 1880, 329,962; 1879, 212,280; increase, 117,682 tons, or 55.4 per cent. The manufactures of the city and the consequent demand for coal are growing very fast.

Grain Movement.

For the week ending Jan. 22 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874	3,008,692	1,675,915	2,445,813
1875	2,934,219	1,048,423	1,655,432
1876	2,033,494	639,319	1,089,941
1877	1,721,443	727,113	1,461,707
1878	3,513,465	2,488,526	3,517,023
1879	3,315,970	1,309,977	2,911,915
1880	2,123,288	1,129,930	2,384,258
1881	2,760,717	1,532,536	2,509,827

Compared with the corresponding weeks of previous years, the receipts of Northwestern markets are the smallest for four years, the shipments of those markets, on the other hand, with one exception, are the largest for eight years; the receipts of Atlantic ports are larger than last year, but smaller than in the two previous years. Compared with the weeks immediately previous, Northwestern receipts are the smallest for a year, and with one exception the smallest for 20 months; the Northwestern shipments were smaller the first three weeks of December, but with these exceptions not since February; the Atlantic receipts are the largest for four weeks, but not so large as the average of January, 1880.

Of the Northwestern receipts, Chicago had 40.2 per cent., Peoria 16.9, St. Louis 13.8, Milwaukee 12.4, Toledo, 8.5, Detroit, 5.2, and Cleveland 3 per cent.

Of the Atlantic receipts New York had 42.4 per cent., Boston, 19.4, Baltimore 17.5, Philadelphia 13.1, Portland 4, New Orleans 2.9, and Montreal 0.7 per cent.

Exports from Atlantic ports for five successive weeks have been:

	Jan. 26.	Jan. 19.	Jan. 12.	Jan. 5.	Dec. 29.
Flour, bbls.	147,994	131,278	189,310	120,499	157,060
Grain, bush.	2,101,331	1,623,952	1,800,828	2,206,164	2,611,377

During the past eight weeks the exports of flour have been nearly 60 per cent. and of wheat nearly 22 per cent. more, and of corn 50 per cent. less, than in the corresponding eight weeks of last year, the aggregate in bushels of all grains and flour being about 2,000,000 bushels, or 16 per cent.

For the week ending Jan. 28, receipts and shipments at Chicago and Milwaukee were:

	Receipts.	Shipments.
Chicago	1,833,046	1,526,970
Milwaukee	363,036	307,900

Here is an increase of one-third in the receipts at Chicago and of one-sixth in those at Milwaukee; an increase, 63 per

cent., in the Chicago shipments, and of 136 per cent. in the Milwaukee shipments.

For the four weeks ending Jan. 28, the receipts and shipments of these markets were:

	1881.	1880.	Inc. or Dec.	P. c.
Chicago:				
Receipts...	Flour..... 427,836	229,024	D.	108.912
	Grain..... 5,238,863	6,425,002	I.	1,186,799
Shipments...	Flour..... 468,161	109,580	I.	268,581
	Grain..... 4,253,372	2,616,342	I.	637,030

	1881.	1880.	Inc. or Dec.	P. c.
Milwaukee:				
Receipts...	Flour..... 221,241	132,200	I.	89.041
	Grain..... 1,319,393	1,721,200	D.	401,807
Shipments...	Flour..... 293,420	155,300	I.	138,120
	Grain..... 600,795	375,700	I.	225,095

The great gain in flour is especially notable, and the flour movement is not only greater than last year, but greater than in any previous year, indicating a decided increase in the flour-mill capacity of the Northwest.

For the same week, ending Jan. 28, receipts at four Atlantic ports were:

	New York.	Baltimore.	Philadelphia.	Boston.
1881	1,086,740	451,221	401,700	347,821
1880	482,962	286,677	195,600	236,275

P. c. of inc. or dec. Inc. 120.3 Inc. 123.7 Inc. 105.6 Inc. 17.4

And for the four weeks ending Jan. 28 their receipts were, flour in barrels and grain in bushels:

	1881.	1880.	Inc. or Dec.	P. c.
New York...	Flour..... 482,160	345,762	I.	136,398
	Grain..... 3,301,597	3,697,519	D.	396,222
Baltimore...	Flour..... 67,101	46,937	I.	20,164
	Grain..... 1,509,017	1,904,818	D.	395,801
Philadelphia...	Flour..... 80,805	44,940	I.	35,865
	Grain..... 1,108,585	1,245,100	D.	136,515
Boston...	Flour..... 155,194	116,130	I.	38,974
	Grain..... 1,452,725	1,117,635	I.	335,090

It is noticeable that there is everywhere a large increase in the flour receipts, nearly five-sixths of which are at New York and Boston. Everywhere, except at Boston, there is a decrease in grain receipts, which at New York and Philadelphia, however, is more than made up by the increase in flour, considered as an equivalent food material, but not as an equivalent weight, which measures the importance of the traffic to the carriers. In the aggregate, at the four points, there was a decrease of 594,552 bushels of grain against an increase of 231,401 barrels of flour, which equals 539,935 bushels of wheat in weight, charged for by carriers, and to about 1,092,000 bushels in food material.

Petroleum.

Stowells Petroleum Reporter gives the production of the Pennsylvania oil fields for December as follows, in barrels of 42 gallons:

	1880.	1879.	Inc. or Dec.	P. c.
Production	2,238,634	1,769,356	I.	469,278
Shipments	1,335,613	1,532,585	D.	196,972
Stock, Dec.	18,928,430	8,470,490	I.	10,457,940
No. of producing wells	14,700	11,900	I.	2,740

The pipe line reports show receipts for the month of 2,170,561 barrels, and deliveries of 1,336,383 barrels.

The Tidewater Pipe Line reports receipts of 173,833 barrels and deliveries of 110,560 barrels. The stock on hand or in transit between Williamsport and Bayonne (in cars) was 1,533,068 barrels.

Chicago and Milwaukee Traffic.

Receipts of grain of all kinds, of flour and hogs at Chicago and Milwaukee for the month of January for four years have been:

	Chicago.			Milwaukee.		
	Grain, bus.	Flour, bbls.	Hogs, No.	Grain, bus.	Flour, bbls.	Hogs, No.
1878.	4,849,407	316,619	926,039	2,374,571	218,678	144,231
1879.	5,941,111	227,574	1,047,874	1,972,932	196,950	150,061
1880.	6,962,754	231,111	601,593	1,678,853	146,989	75,941
1881.	5,693,237	474,948	775,776	1,561,800	255,263	78,201

Taking flour and grain together Chicago receipts are about as large this year as last, and Milwaukee receipts larger, and both together larger than in any previous January. In hogs, however, the receipts, though larger than last year, are much less than in 1878 or 1879.

Petroleum Exports.

The exports of petroleum from the Atlantic ports for four successive years have been:

	1880.	1879.	1878.	1877.
New York	266,021,776	291,181,533	216,565,282	250,707,538
Philadelphia	58,029,089	86,305,933	73,641,581	47,781,903
Baltimore	15,024,796	24,034,198	38,739,936	45,223,727
Boston	10,081,925	6,246,766	3,664,084	4,351,428
Richmond	1,302,064	1,408,580	898,000	4,882,314
Portland	7,333	123,088	497,270	1,407,984
Norfolk	.....	.....	.....	391,100
Total	350,469,983	409,300,078	334,006,152	354,847,969

The percentages of the total shipments at the several ports were:

	1880.	1879.	1878.	1877.
New York	75.9	71.1	64.8	70.6
Philadelphia	16.5	26.0	22.0	13.5
Baltimore	4.3	5.9	11.6	12.8
Boston	2.9	1.5	1.1	1.2
Richmond	0.4	0.3	0.3	1.4
Portland	.....	.....	0.2	0.4
Norfolk	.....	.....	.....	0.1
Total	100.0	100.0	100.0	100.0

The December exports were much larger than the average for the year, as follows:

	1880.	1879.	1878.	1876.
37,424,000	37,175,000	25,818,000	19,160,000	26,000,000

This month includes five weeks. This is at the average rate of 7,485,000 a week, against 5,119,600 in November; at the December rate a year's exports would be nearly 390,000,000 gallons, or 40,000,000 more than they were actually in 1880.

Illinois Crops.

The Illinois Department of Agriculture reports that in 1880 7,574,545 acres were planted with corn, which is about 3 per cent. less than in 1879. The crop of 1880 is estimated to be 250,697,036 bushels, or at the average rate of 33 bushels per acre.

The area in Illinois sown to wheat last fall is reported by the state Department of Agriculture to be 3,049,631 acres, against 2,970,080 the previous year. The present condition is also reported by that authority to be excellent, which is just the contrary of other reports that have been published lately, which say that throughout the Ohio valley the wheat is so winter-killed that there cannot be half a crop. But reports, unless made by parties known to be trustworthy and disinterested, should carry little

only at the Castle Garden office, full rates being charged nominally at the outside offices, though there is really nothing to prevent tickets being bought at the cut rates by any one who wants them. The Central and Erie last week joined in a letter to the Commissioners of Emigration in New York, but they decline to interfere, saying that they have no right to do so, and that their only concern was to see that the immigrants were treated fairly, the rates being no concern of theirs so long as they were not unreasonably high.

Chicago Shipments Eastward.

For the week ending Jan. 22 the shipments from Chicago under the pool were:

	Flour, bbls.	Grain, tons.	Provisions, tons.	Total, tons.	P. c. of total.
Michigan Central	23,060	7,507	2,532	12,345	24.2
Lake Shore	20,710	8,509	4,188	14,767	28.9
Fort Wayne	44,905	1,899	3,264	9,662	18.9
Pan-Handle	18,483	385	4,521	6,754	13.2
Baltimore & Ohio	1,375	1,733	2,282	4,152	8.1
Grand Trunk	4,647	2,022	908	3,395	6.7
Total	113,279	22,055	17,696	51,075	100.0

For six successive weeks the shipments have been, in tons:

Dec. 18.	Dec. 25.	Jan. 1.	Jan. 8.	Jan. 15.	Jan. 22.
45,007	51,396	41,807	49,367	54,935	51,075

In the week ending Jan. 22 nearly two-thirds of the shipments were grain and flour, notwithstanding this is the season when provision shipments are usually largest and grain shipments lightest.

The shipments for the week ending Jan. 29 were:

	Flour, bbls.	Grain, tons.	Provisions, tons.	Total, tons.	P. c. of total.
Michigan Central	16,383	8,882	2,946	13,466	24.6
Lake Shore	28,218	6,078	5,405	14,394	26.3
Fort Wayne	57,873	2,551	3,313	11,652	21.3
Pan-Handle	22,874	486	4,755	7,527	13.8
Baltimore & Ohio	3,565	1,272	2,577	4,210	7.7
Grand Trunk	2,172	2,704	530	3,450	6.3
Total	131,085	21,973	19,916	54,689	100.0

Thus the last week's shipments are larger than in any of the other six.

Utah Freight Traffic.

For the year ending Dec. 31 the tonnage moved over the Utah Central, Utah Southern and Extension roads was, in tons:

	1880.	1879.	Increase.	P. c.
Utah Central	140,380	123,857	16,523	13.3
Utah Southern	129,384	122,611	6,773	5.5
Utah Southern Extension	24,538	.....	.....	.....

Leading items of freight on the Central were 64,829 tons of coal and coke, 9,884 tons railroad material and 6,041 tons lumber. On the Southern, 31,027 tons ore and bullion, 20,804 tons coal and coke, 17,950 tons railroad material, 11,110 tons rock and limestone and 10,882 tons iron ore. On the Southern Extension, 6,351 tons ore and bullion, 4,257 tons coal and coke and 2,865 tons iron ore. Nearly all the freight passing over the Extension goes over the Southern road also. The Extension was not open in 1879.

Passenger Commissions to Colorado, New Mexico & Pacific Coast Points.

J. W. Morse, General Passenger Agent Union Pacific; H. C. Nims, General Passenger Agent Denver & Rio Grande, and W. F. White, General Passenger Agent Atchison, Topeka & Santa Fe, have just issued the following joint circular: "In pursuance of an agreement made between the General Managers, notice is hereby given that on and after Feb. 1 the payment of commissions on tickets sold over our respective lines to all points west of Kansas and Nebraska, except Montana, the Black Hills, and local points in New Mexico, south of San Marcial, will be discontinued."

Absorption of Arbitrariness to New England Points.

Circulars recently issued notify the Western lines that, by agreement between the trunk lines and their New England connections, the "absorption of arbitrary rates" to New England points ceases from Feb. 1, being absolutely discontinued from that date.

THE SCRAP HEAP.

Locomotive Building.

H. K. Porter & Co., in Pittsburgh, recently delivered a narrow-gauge locomotive to the Waynesburg & Washington road. They are building several narrow-gauge engines for a road in Texas, and several shifting engines.

The Mason Machine Works, at Taunton, Mass., are to build 12 engines for the Wheeling & Lake Erie road.

The Altoona shops of the Pennsylvania Railroad have begun to build 10 new heavy passenger locomotives with 5 ft. 8 in. drivers. They are for use on the main line between Philadelphia and Pittsburgh.

The Meadville shops of the New York, Pennsylvania & Ohio road are building two heavy passenger locomotives for the road.

The Pittsburgh Locomotive Works have orders for a number of heavy freight engines on hand and are full of work.

Car Notes.

The Ohio Falls Car Co., at Jeffersonville, Ind., built in 1880 no less than 100 passenger, mail and baggage cars, 3,500 box, 250 stock, 659 flat and 350 coal cars, being 4,859 cars in all. The shops now employ 1,400 men.

The Lehigh Car & Manufacturing Co., at Stenton, Pa., is running to its full capacity. Just now the works are turning out 16 gondolas a day on an order for 1,100 for the Missouri Pacific.

The Steubenville (O.) shops of the Pittsburgh, Cincinnati & St. Louis road made last year near 2,000 freight cars. They are now building six new passenger cars.

The Huntington Car Works, at Huntington, W. Va., have begun work with a good supply of orders. Mr. John Kelly, formerly of Wilmington, Del., is Superintendent.

The Billmyer & Smalls Co., at York, Pa., has an order for 1,000 cars for the Mexico National Construction Co. A. Whitney & Sons, in Philadelphia, are making the wheels.

The Wheeling & Lake Erie road, now under construction, has ordered 14 passenger and baggage cars from the Wason Manufacturing Co., at Springfield.

The old stove works in Conshohocken, Pa., have been bought by John Wood, Jr., who is putting in machinery and will soon begin to build freight cars there.

The Wason Car & Foundry Co., in Chattanooga, Tenn., has a large amount of work on hand.

Iron and Manufacturing Notes.

Heller & Brightly, of Philadelphia, makers of instruments,

have orders for over 100 sets of field instruments (each set including a transit, a level, rods, chains, poles, tapes, etc.), from the Denver & Rio Grande, the Mexican Central and the Mexican National Construction companies.

In consequence of these large orders and others from Brazil and Japan, Heller & Brightly give notice that they cannot for the present accept any orders for immediate delivery. Correspondents wishing to give orders for future delivery (in no case earlier than ten weeks from Jan. 29) are requested to notify the firm as to the longest time they can wait.

Blackmer & Post, in St. Louis, have furnished extra heavy pipe for railroad culverts to the Texas & Pacific, the International & Great Northern, the Minneapolis & St. Louis, the Burlington & Missouri River in Nebraska, the Union Pacific and many other roads. This pipe is made of extra thickness and from 12 to 24 in. diameter.

The new Klonan Rolling Mill at Homestead, near Pittsburgh, has been sold by the executors of the late Andrew Klonan to the Pittsburgh Bessemer Steel Co., which has nearly completed its steel works on land immediately adjoining the rolling mill. The intention of Mr. Klonan was to work up the product of the steel works in his mill, but his death has changed the arrangements so far that both establishments will be owned by one company.

The Roane Iron Co., at Chattanooga, Tenn., is making a lot of steel rails for the Louisville & Nashville road.

The Cambria Iron Co., at Johnstown, Pa., has been making steel rails for the Louisville & Nashville road. The company has a contract for steel rails for one of the new lines in Mexico.

Wm. Sellers & Co., in Philadelphia, have a large order for machine tools for the shops of the Denver & Rio Grande roads.

The Cleveland Rolling Mill Co. intends to remove its remaining blast furnace this year from their present site to land belonging to the company between the Cuyahoga River and the old canal bed in Cleveland.

The United States Metallic Packing Co. last week filed a bill in the United States Circuit Court in Boston against the Hancock Inspirator Co. and Thomas Tripp, of Boston, for infringement of patent.

H. G. Newton, of New York, has just filed a large order for Lyon's asbestos paint from a prominent Eastern road.

Isabella Furnace, in Reading, Pa., is in full blast, after standing idle for several years.

The Wheatland Bessemer Steel Co. has been incorporated for the purpose of buying and working the rolling mill at Wheatland, Pa., which has been idle for several years. A Bessemer steel plant is to be added to the mill.

The Akron Iron Co. has its rolling mill at Akron, O., in full blast, and has recently made some additions.

The Pottstown Iron Co., at Pottstown, Pa., is running its two blast furnaces, rolling mill, plate mill and nail mill full double time.

The Rail Market.

Steel rails are active, with one sale of 15,000 tons reported, and a number of smaller transactions. Quotations continue about \$60 per ton at mill.

Iron rails are also active, with many sales, chiefly of small lots. Quotations are from \$47 per ton at mill for heavy rails, up to \$52 for light sections. Some sales of English rails are reported at \$44 to \$45 at tidewater.

Old iron rails are still firmly held at \$28.50 to \$31, according to quality.

Spikes are somewhat higher, \$2.75 to \$3 per 100 lbs.; splice-bars, \$2.35 to \$2.40.

Winter Navigation of Lake Michigan.

A correspondent of the Chicago Tribune, writing from Milwaukee, Jan. 23, says:

"There are a good many people in the United States who do not know that there is a regular line of boats plying between Milwaukee and the east shore of Lake Michigan, and that they make their trips with surprising regularity. When you know that there is ice in the bay a foot thick, and that the thermometer is 20 degrees below zero, you wonder what on earth the fog-horn can be blowing for, and are surprised to learn that it is to guide the incoming steamer through the fog into port. Steamers go and come between this city and Grand Haven, with almost the regularity of summer, in spite of the ice and in defiance of the intense cold weather. They are huge propellers, built as strong as wood and iron can make them, and covered with iron-plate on the outside on purpose to contend with the tremendous fields of grinding, crunching ice that they often encounter. Getting in and out of port is the only trouble, and that is usually more easily accomplished than most people suppose. The ice being broken every twenty-four hours, and often every twelve hours, of course it is not permitted to freeze very thick, and one of those great boats forces its way in or out with little difficulty. Recently the propellers Depere, City of Ludington, and Menomonee were a week making a trip that usually consumes but two days. The boats left Milwaukee Sunday afternoon, and arrived off Muskegon early Monday morning. The ice was very thick, and extended out into the lake about three-quarters of a mile. The boats immediately began breaking the ice, and managed to get within half a mile of the shore. They then slowly worked their way down the shore through the fields of ice, and were three days in reaching Grand Haven. When they arrived off the mouth of the harbor they found the entrance so choked and jammed full of ice that it required the combined efforts of the three boats to dislodge it. On their return trip, after leaving Grand Haven, they found a crack in the ice leading up the shore for about twenty miles, which they followed, until they found a passage out into the open lake, and returned to Milwaukee in safety."

Railroad Wages Thirty Years Ago.

A New Hampshire paper gives in a recent issue a summary of the contents of the annual report of the Concord Railroad for 1851. The report filled 81 pages and contained a list of all the tools owned by the road, of all the furniture in the stations on its line, and every other article, however small, that went to make up its assets; and, besides these, a complete roll of all the employees of the road from the superintendent down to the wood-sawyers, with the wages paid to each. Isaac Spalding was President, with a salary of \$1,000; the Hon. N. G. Upham was Superintendent, and got for his services \$2,000 a year; the chief clerk got \$800, and the assistant \$340, the latter being Henry McFarland, now Treasurer of the Union Pacific, with a salary of \$5,000; George Clough was a passenger conductor and got \$50 a month, which was the pay of the station agent at Nashua; engineers on passenger trains had \$2.25 per day, and those on freight trains \$2; brakemen and firemen, \$1.25, and wood-sawyers and section men \$1; the ticket agents at Concord and Manchester had \$800 a year, and ex-Gov. James A. Weston, who was the road engineer, \$1,000; the wood shop at Concord was in charge of the Hon. John Kimball, who had \$3.19 per day, and one of his workmen was his brother, Benjamin A., who got but \$6 per week. These last mentioned are now two of the wealthiest men in Concord, and one is a director of the road. At that time the road did but a third as much business as now, but it paid 10 per cent. dividends, as it still continues to do.

OLD AND NEW ROADS.

Baltimore & Ohio.—It is now reported that this company has made all necessary arrangements with the Delaware Western Company, and that, as soon as the amendment to that company's charter is passed by the Delaware Legislature, work will be begun on the proposed new line between Baltimore and Philadelphia. It is said that the surveys are all completed and the route located.

Bangor & Bucksport.—This company has applied to the Maine Legislature for authority to extend its road from Bucksport east by south to Ellsworth, 22 miles. The line has been surveyed and located, and it is estimated that the cost will not exceed \$10,000 per mile.

Boston & Albany.—In the report of the Massachusetts Railroad Commissioners on the complaint against this company for maintaining a nuisance at the Kneeland street crossing in Boston, they say:

"As the result of the hearing on Jan. 19, the board finds that there was no good reason for the delay by the Boston & Albany Railroad Company from March to July, during which time nothing was done about the building of a new station, and no contract was made for it. This delay ought not to have occurred in a case where the need of action was so pressing, and when assurances had been given that the building would be completed by January, 1881. It is a difficult matter to ascertain with what degree of diligence the work has been prosecuted since it was begun. But it is easy to decide with what diligence it should be prosecuted; and it seems to the board that the Boston & Albany Railroad Company fails to see this or to appreciate the position in which it stands. This is not the ordinary case of a railroad company building at its leisure a new station for the better accommodation of the public. It is the case of a corporation maintaining an illegal and dangerous nuisance, and bound to abate it at the earliest practicable moment. It is in evidence that on one day Kneeland street was obstructed 98 times, aggregating 4 hours and 8½ minutes. Of these obstructions 14 exceeded five minutes each. Thus, at least 14 penalties were incurred in one day. The law is well settled that the necessities of traffic furnish no legal defence to prosecution for such offenses. The injured parties very properly forbear to prosecute; but such forbearance should not check the energy of the company in constructing its new buildings, but should rather increase it. The managers of the corporation state that spring is the time when the condition of their business will most favor the new construction. And, when the state of the weather allows of building, the work ought to be prosecuted, as we believe it will be, with the utmost diligence and speed compatible with safety."

Canada Railroad Legislation.—The applications for legislation now before the Parliament of the Dominion of Canada are thus summed up by the Toronto *Monetary Times*:

"The North Shore Company wishes certain resolutions confirmed, having for their object the transfer of all the company's interest in their road to the province of Quebec. The Montreal, Portland & Boston Railway Company wants an extension of time for the completion of its railway, and to extend a branch line to connect with the International. The Northern requires, as we have said, an act to authorize the company to issue additional bonds or stock for the purpose of raising capital for changing the gauge and other purposes. The St. Lawrence & Ottawa Railway Company require to extend the line of their railway from some point in the city of Hull to the village of Deserit, on the Gatineau River, and to construct or lease and operate branch lines of railway; and the Grand Trunk require to extend their branch between Berlin and Galt to Paris or some point on their Buffalo & Goderich line. Acts of incorporation are asked for the Southeastern Railway, which is to extend from Winnipeg to the Lake of the Woods. Power is asked to construct a line from some point in the county of Prescott to connect with the Grand Trunk under the name of the Montreal & Prescott Railway. Power is asked to construct and work a railway from a point on the Canadian Pacific Railway west of the Assiniboine River; thence northwesterly in the direction of the Great Slave Lake in the Peace River district. Also, to construct and work a railway from a point at or near the elbow of the South Saskatchewan River to a point near the forks of the Saskatchewan River, and thence northeasterly to Hudson Bay, with a branch southwesterly along or near the valley of the South Saskatchewan."

"A company is wanted to construct and work a railway from a point where the Canadian Pacific Railway crosses the Assiniboine or the Qu'Appelle River, northwesterly to and through Prince Albert settlement, and thence to the Peace River. A company is seeking incorporation with power to construct and work a railway from the Hull iron mines to the Ottawa River, with a right to construct a bridge across the Ottawa River or acquire running powers over any other bridge."

Central Pacific.—The 3 per cent. dividend was paid Feb. 1, as advertised, but the Attorney-General of the United States, has filed a bill to restrain its payment. According to the agreement noted last week, bonds for \$750,000 to replace the money if the case is decided against the company, were given. The suit brought is a friendly one, and is simply to bring the law before the courts for interpretation.

A dispatch dated Feb. 3, says: "The sheriff of Lander County, Nev., has levied on three freight trains and one passenger train, at Battle Mountain, to satisfy judgments for delinquent taxes, amounting to \$24,000, in 1880, due from the Central Pacific Railroad Company. As fast as trains come in they are tied up by the sheriff."

Chicago & Atlantic.—It is reported that work is soon to be begun on this projected line from Marion, O., to Chicago, 263 miles. The line was located several years ago. The names of the parties advocating the scheme do not promise a very speedy completion of the work.

Chicago, Saginaw & Canada.—The New York Supreme Court at General Term has set aside the decision of the Special Term, which declared void 3,574 bonds of this road owned by B. C. Richardson. The Court holds that at least 600 of the bonds are valid, and orders a new trial as to the whole case.

Cincinnati Central.—This company opened books for subscription in Cincinnati, Jan. 29, and the whole amount of stock—\$1,000,000—was taken at once. The company purposes building a belt line around Cincinnati with surface or elevated spurs into the city, to be used to connect all the railroads entering the city, and also as a rapid transit line between the city and its suburbs.

Cincinnati, Indianapolis, St. Louis & Chicago.—A petition has been filed in the United States Circuit Court in Indianapolis by John L. Brownell, of New York, for himself and other stockholders of the old Indianapolis, Cincinnati & LaFayette Company, asking that a master be appointed to report to the Court the amount of the liens upon

the road at the time of the foreclosure by which the road passed to the present company, in order that petitioners may redeem and recover the property by payment of such liens.

Cincinnati, Van Wert & Michigan.—This company has been formed by the consolidation of several small companies in Ohio. The projected line is a narrow-gauge from Van Wert, O., north to Jackson, Mich., about 100 miles.

Denver & Rio Grande.—The following is the first circular issued by the new General Superintendent of this road, Mr. G. W. Cushing:

"It is desired that all unnecessary labor be dispensed with on the Sabbath day, and that only such employes be required to labor as are really needed in the proper dispatch of necessary trains.

"Heads of departments and others in charge of men on the line of operated road, including all shops, round-houses, depots and yards will so arrange their work as to conform to the meaning of this circular."

Other managers would do well to copy.

Des Moines & St. Louis.—This company has been organized to build a railroad from Des Moines, Ia., southward about 50 miles to Humeston, to connect with the Wabash system.

Evansville, Seymour & Bellefontaine.—This company has been reorganized by the consolidation with it of the Evansville & Seymour, a rival organization which projected a road on much the same line. Arrangements are being made to begin work on the line from Evansville, Ind., to Seymour.

Fort Wayne, Muncie & Cincinnati.—Notice is published that parties holding any of the bonds of this company who wish to participate in the foreclosure proceedings, should surrender their securities without further delay to the committee at Room 27, Sear's Building, Boston, or to the Farmer's Loan & Trust Company, in New York.

Greeley, Salt Lake & Denver.—This company has filed articles of incorporation in Colorado to build a railroad from Greeley to Ft. Collins and up the Cache la Poudre to the Utah line in the direction of Salt Lake. Also branches from Ft. Collins by Erie to Denver and from Ft. Collins by Boulder and the Marshall coal mines to Denver.

Gulf, Colorado & Santa Fe.—Track on this road is now laid to the Leon River, 31 miles beyond the late terminus at Rogers, Tex., and 219 miles from Galveston. Only the bridge over the river and about five miles of track remain to carry the road to Belton.

Hannibal & St. Joseph.—This company has given notice to the Governor of Missouri that it is ready to pay to the state the principal of the \$3,000,000 aid bonds issued to the road. The company has always paid the interest on these bonds. It is uncertain whether the state will accept payment, as one-half of the bonds do not mature until 1886, and the other half until 1894, and the state, if it accepts the money from the company now, will have to pay interest on the bonds until they become due, there being no provision for calling them in before maturity.

International & Great Northern.—The report of General Baggage Agent William K. Bixby for 1880 shows the following figures: Total number of pieces of checked baggage carried between points on line of International & Great Northern Railroad during the year 1880, 76,253; during the year 1879, 61,959; increase during the past year, 14,294; number of pieces of baggage lost, none; number of claims for pieces lost, none; number of claims for damage, 6; number of claims for delay, 1; number of claims paid, none. Nor does the report show any loss since May, 1879, although the company has carried 118,203 pieces of baggage without loss and without suit.

Jacksonville, Pensacola & Mobile.—On the morning of the 28th the foundry belonging to this road in Tallahassee caught fire. The fire spread to the other shops, and all were destroyed except a carpenter shop lately completed. The loss is estimated at \$35,000. The shops were all frame buildings.

Keokuk & Northwestern.—Track is now laid to Mt. Pleasant, Ia., nine miles northward from the late terminus at Salem and 46 miles from Keokuk.

Negotiations are pending for the building of a branch from Salem northwest to Fairfield, about 20 miles. Its construction depends upon the amount of local aid offered.

Lake Erie, Alliance & Ohio River.—This company has filed articles of incorporation to build a railroad from Alliance, O., to Bellaire, about 70 miles. It will be an extension of the Alliance & Lake Erie road, now in operation from Alliance to Braceville, and soon to be extended to a junction with the Painesville & Youngstown road.

Lake Huron Shore.—This company was organized recently at Alpena, Mich., for the purpose of building a railroad from that place southward along the shore of Lake Huron to Saginaw or Bay City. It is proposed to build a standard-gauge road.

Little Miami.—At the annual meeting recently the following statements were presented:

Surplus, Jan. 1, 1880.....\$116,660.86

Receipts from rental paid by lessee, etc.....686,375.13

Total.....\$803,035.99

Total charges on income.....608,003.40

Surplus, Jan. 1, 1881.....\$135,032.59

Cash account:

Cash on hand, Jan. 1, 1881.....\$20,418.50

Cash receipts, rental, interest, etc.....686,375.13

Total.....\$706,793.63

Dividends and interest paid.....648,816.57

Cash balance, Jan. 1, 1881.....\$57,977.03

The company has paid from the above surplus \$100,000 bonds which matured Dec. 31 last.

Louisville, Cincinnati & Lexington.—Wm. B. Dinsmore, a stockholder, has filed a bill in the Chancery Court at Louisville, Ky., asking for an injunction to restrain the company from issuing new stock as authorized by the stockholders at their meeting on Oct. 25 last. The bill claims that the issue is a violation of the agreement contained in the articles of incorporation, and is also an injury to stockholders as tending to diminish the value of their stock.

Mexican Southern.—A bill has been introduced in the New York Legislature to incorporate a company by this name. The incorporators named are U. S. Crant, E. D. Morgan, Matthias Romero, Porfirio Diaz, Miguel Castro, Edward D. Adams, Jay Gould, Thomas Nickerson and others. Apparently it is intended as a union of the different companies projecting lines in Mexico.

Midland, of New Jersey.—This company refused to surrender possession of the Middletown, Unionville & Water Gap road on Jan. 26, and still continues to run trains over the road. About \$17,000 arrears of rental were due on Jan.

1, and the Midland tendered payment; it was refused by the lessor company, and afterward accepted. The Midland offer to pay \$21,000 a year, but the other company wants \$31,000.

Minneapolis & St. Louis.—Reports were last week circulated that the Chicago & Northwestern Railroad Company had secured control of this road, which extends southward from Minneapolis to Albert Lea and Ft. Dodge. The correctness of the rumor was denied at the office of the Northwestern Company.

New Mexico & Rio Grande.—This company has filed articles of incorporation in Colorado to build a railroad in Arapahoe County in that state and Socorro County in New Mexico.

Ohio & Mississippi.—Receiver King's report for December is as follows:

Cash balance, Dec. 1.....\$211,019.10

Receipts from all sources.....586,253.32

Total.....\$797,272.42

Disbursements.....533,576.18

Balance, Jan. 1, 1881.....\$263,696.24

The receipts exceeded the payments by \$52,677.14 for the month. Disbursements included \$60,000 in settlement of the old Indiana Southern claim to the road-bed of the Louisville Branch.

Ontario Railroad Legislation.—At the present session of the Parliament of Ontario bills are to be presented "to make provision for greater safety of employes and the public," and to provide for the construction of a link to connect the Ontario railroad system with the Canadian Pacific.

Private and special bills before the House are thus summed up by the Toronto *Monetary Times*: "The Georgian Bay & Wellington Railway desires to have its by-laws ratified, certain agreements confirmed and an extension of time given to complete its promises. Power to issue additional bonds or stock is asked for by the Hamilton & Northwestern. The Trent Valley asks power to increase its stock by \$200,000, and the Whitby, Port Perry & Lindsay wishes to acquire and work vessels, harbors and elevators; to extend the time for the construction of the branch line to Uxbridge, of the branch line to Beaverton, and the completion of the line to Gravenhurst, Parry Sound and French River; also for power to extend the line from French River to Sault Ste. Marie, to re-arrange the company's mortgage bond debt and extend its borrowing powers, to enable it to issue mortgage bonds. The London Junction Railway wants an extension of time to fulfill its obligations. The Prince Edward County Railway asks power to extend its line from its eastern terminus to any point on the Grand Trunk, and northerly from Trenton to Madoc. Amendments are asked by the Credit Valley enabling it to readjust its capital account; make a further issue of bonds, or make a new issue not to exceed \$30,000 per mile, in order, with the consent of two-thirds of bondholders, to recall the existing issues, or to issue a debenture stock with a new issue of bonds. The Grand Junction wants an act to enable the municipalities along its line to aid the road. And the Toronto & Nipissing desires power to construct branch lines, not more than 30 miles in length. An act of incorporation is asked for the Canada West, a line in opposition to the Toronto & Ottawa, now being located. Authority is asked to construct a railway from Duffin's Creek Station, crossing Yonge street north of Yorkville, to connect with the Grand Trunk Railway, at or near Weston, and also at or near Duffin's Creek. The town of Chatham asks to have a company incorporated to build a line from there to Charing Cross on the Canada Southern.

Oregonian.—A correspondent sends us the following:

"This is a narrow-gauge road, running from Portland 30 miles south, and then branching into two lines, draining the eastern and western sides of the great Willamette Valley. About 115 miles are now running, including 30 miles purchased. In December the contractors turned over 84 miles of road built and equipped since June last. The Oregonian Railway is intended as part of a through line east, its eastern objective point being either Winnemucca, to connect with the Central Pacific, or Baker City, where it will join the Utah & Northern, and strike the Union Pacific at Ogden. Sixty miles of steel rails have been shipped from England for this year's use."

Pennsylvania.—It is reported that a survey has been made for a loop line over the Allegheny Mountains, following mainly the line of the old Portage road and the Pennsylvania Canal. This line, it is said, would shorten the distance between Harrisburg and Johnstown, but would require some heavy grades.

On the Philadelphia & Sea Shore line in New Jersey a long pile bridge is to be built across Barnegat Bay, connecting the beach with the main land. One or perhaps two drawspans will be put in. Work on the piling will begin in a few days.

Arguments in the Junction Railroad case were to have been heard Feb. 2, but were set over to Feb. 7 by the Court.

Philadelphia & Reading.—The managers have fixed the day for the annual meeting on March 14, and issued notices accordingly. It is understood that this is satisfactory to the opposing party, and the *mandamus* proceedings have been withdrawn.

In the matter of the Biddle suit in relation to the deferred income bonds, the United States Circuit Court, on Jan. 27, made an order that the installments on the deferred income bonds, when paid to the Receivers by the complainants, shall be held by them on special deposit, distinguished from all other bonds, and shall only be appropriated by them to the payment on account of said deferred income bonds, and then only after further order of court upon notice to the complainants, and the said payments shall be returned to the complainants if the order of the Court authorizing the issue of said bonds be revoked. The above order is entered by consent of counsel for the respective parties.

After long argument on the motion to enjoin the issue of deferred bonds and to revoke the order authorizing their issue, the Court made the following order, by agreement with counsel for both parties:

"And now, Jan. 27, 1881, the Court overrules the motion to suspend the operation of the decree of Nov. 18, 1880, but advises the Receivers not to enforce any forfeiture for the non-payment by subscribers to the deferred bonds of any installments due thereon until the motions now pending for argument on Monday, Feb. 7, 1881, have been disposed of."

Pittsburgh, Cincinnati & St. Louis.—Chief Engineer Becker informs us that the contract for Gould's tunnel on this road, seven miles west of Steubenville, O., has been awarded to Patterson & Kearns, of Philadelphia. The tunnel is intended to avoid a crooked and circuitous piece of road.

Port Royal & Augusta.—A grain elevator with a capacity of 100,000 bushels has been completed and opened for business at Port Royal, S. C., the seaboard terminus of this road.

Rome, Watertown & Ogdensburg.—A suit has been begun to enjoin any further payments on bonds issued by the town of Salina, N. Y., in aid of the Syracuse Northern road, now owned by this company, on the ground that the bonds were not legally issued. The Court is asked to declare the bonds fraudulent and void.

St. Louis & Southeastern.—The purchasing trustees, having received a deed of this road from the Court, have conveyed it to the new company organized by the purchasing bondholders, which is known as the Southeast & St. Louis Company. The new company has duly executed a mortgage for \$6,500,000, under which the Louisville & Nashville Company is to issue bonds as provided by the lease and agreement with the bondholders.

St. Paul, Minneapolis & Manitoba.—At a recent conference with parties interested, General Manager Hill agreed on behalf of this company to build next season a branch from Fergus Falls, Minn., up the Pelican Valley to Pelican Rapids, and to extend the line further as needed.

South Carolina.—The following notice is issued to stockholders and creditors:

"The Purchasing Committee, appointed by an agreement between stockholders, bondholders and other creditors of the South Carolina Railroad Company, dated May 1, 1880, regret to announce that, owing to the great change in the situation of the company's affairs, caused in part by the decree of the United States Circuit Court in the foreclosure suit, and in part by the discovery of large outstanding obligations of the company not entered upon its books, it will be impracticable for the committee to carry out the plan of reorganization according to its present terms, in case they purchase the road. The outstanding valid first and second mortgage bonds, recognized by the decree of the Court, far exceed the limit of first consolidated mortgage bonds allowed by the existing plan of reorganization.

"It will, therefore, be absolutely necessary, if the committee are to purchase the road, and it is not to be unduly weighted with fixed interest charges, nor deprived of all means to make necessary improvements, that the committee's powers should be enlarged, that the unsecured creditors should accept income mortgage bonds of the reorganized company, and that the amount of the first consolidated mortgage bonds should be increased, while that of the second mortgage bonds should be correspondingly diminished.

"The committee, accordingly, have drawn up a modification of the plan of reorganization (which will be found at the office of the Farmers' Loan and Trust Company, No. 26 Exchange place, New York, and also at the office of Mr. John S. Barnes, Chairman, No. 18 Wall street), which they earnestly request may be signed by all the parties to the existing agreement. At the same time all receipts heretofore given by the committee, under the present plan of reorganization, must be exchanged at the office of the Farmers' Loan and Trust Company for new receipts, issued under and in conformity to the amended agreement.

"Until these receipts are thus exchanged the committee deem it unsafe for them to bid at the sale of the road; and, if the sale should occur before such exchange is complete, the most which the committee can do for their beneficiaries will be to collect from the proceeds of the sale the proportion belonging to the various securities deposited with them.

"The general result of the modifications proposed by the new agreement is as follows:

	Present plan.	Proposed plan.
First mortgage.....	\$4,500,000	\$5,000,000
Second mortgage.....	2,000,000	1,500,000
Income mortgage.....	2,000,000	3,000,000
Stock mortgage.....	5,822,200	4,657,760
	\$14,322,200	\$14,157,760

"Unless within sixty days from this date the new agreement is signed and the receipts exchanged, the committee will consider themselves discharged from all obligation to bid at the foreclosure sale, and cannot undertake to do more than to solicit proper cash bids from outside parties, and see that the surplus is distributed according to the legal priorities of the mortgage bondholders."

Southeastern, of Canada.—This company, according to a telegram from Montreal, has decided to build a new short line from Montreal to St. John, N. B., by way of Sherbrooke, P. Q., and Bangor, Me. Existing lines are to be used as far as possible, so that not much more than half of the proposed line of 280 miles will have to be built. The project has been agitated for several years by two or three different companies.

Syracuse, Chenango & New York.—A corrected version of the sale of this road is given by the Syracuse *Herald*, as follows: "Mr. Howlett, of the Salt Springs National Bank, who has been arranging the financial details of the sale of the Chenango Valley road, says that where there are so many people interested it will be difficult to get everything ready for the first of next month, yet the purchasers are acting in good faith and are anxiously willing to carry out the conditions of their bargain, which in substance may be stated as follows: For the \$500,000 of common stock there will be paid 10 per cent. on the face value and 50 per cent. on the \$301,400 preferred stock. The \$261,000 first-mortgage bonds the syndicate will pay in full at par within six months after Feb. 1 next. But for all arrears of interest and whatever is due on the coupons to Feb. 1 next the purchasers will pay 50 cents on the dollar. Already the consent of the necessary stock and bondholders has been obtained."

Utah Southern & Castle Valley.—This company has filed articles of incorporation in Utah to build a railroad, described as follows: "From Juab Station, in Juab County, Utah territory, thence in a southerly course along the Sevier River, to the mouth of Salina Cañon; thence through said cañon by the most feasible route; thence in an easterly course to the junction of Ives and Muddy creeks, in the county of Emery, the length of said line being about 80 miles; also a line from the mouth of said Salina Cañon, thence by way of Sevier River to Marysville, in Piute County, Utah territory, a distance of about 40 miles; the entire length of said road being, as near as may be, 120 miles, situated in the counties of Juab, Sanpete, Sevier, Emery and Piute."

The capital stock is to be \$1,800,000; the incorporators are Sidney Dillon, Jay Gould, John Sharp, W. H. Hooper, W. Jennings, Feramor Little, L. E. Holden, H. S. Eldredge, L. S. Hills, J. T. Little, J. B. Rosborough, S. Merritt.

Virginia Midland.—This company has been fully organized by the bondholders who bought the Washington City, Virginia Midland & Great Southern under foreclosure. The meeting was held in Alexandria, Va., Feb. 1, at which directors were chosen and resolutions passed authorizing the construction of branch roads, and extending the time during which holders of the old company's securities may join in the reorganization; also, authorizing the issue of bonds as provided for by the plan of reconstruction.

Wabasha & Lake Superior.—This company has been organized to build a railroad from the Mississippi River opposite Wabasha, Minn., to Superior City, at the head of Lake Superior. The new company asks the Wisconsin Leg-

islature to transfer to it the lands granted to the old Portage & Lake Superior road.

Washington & Chesapeake.—This company has filed articles of incorporation in Maryland to build a railroad from Washington east by south to Herring Bay in Anne Arundel County, Md., about 30 miles. The capital stock is to be \$300,000.

Washington City & Point Lookout.—Work has been begun on this road at Brandywine, Md., on the Pope's Creek line of the Baltimore & Potomac road. The intention is to build from that place to Point Lookout, leaving for the present the section from Brandywine to Washington. The contractors are P. P. Dickinson & Co., of New York.

ANNUAL REPORTS.

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Intercolonial.

This road, owned by the Dominion of Canada, consists of the main line from Halifax to Point Levis (opposite Quebec), 686 miles; the line from Moncton, N. B., to St. John, 89 miles; from Truro, N. S., to Pictou Landing, 52 miles; from Painesville, N. B., to Shediac, 11 miles, and 8 miles of short local branches, making 846 miles in all. The report is for the year ending June 30, 1880; for the previous year the mileage was 714 miles.

The report of the Minister of Railways and Canals says: "The purchase of the Riviere du Loup Branch was effected on Aug. 1, 1879, on the terms and conditions stated in last year's annual report. The purchase money—\$1,500,000—has been paid to the Grand Trunk Railway Company, and by them has been applied, in accordance with the conditions of the purchase, toward the establishment of independent railway connection between Sarnia and Chicago. Works of repair were commenced on the Riviere du Loup section as soon as the transfer to the government was made, and the expenditure for these repairs and improvements, up to June 30 last amounted to \$389,575.43. The total capital account at the close of the year 1879-80, in connection with the Intercolonial, amounted to \$38,865,719.64, compared with \$36,317,705.04 for the year 1878-79.

The expenditure on capital account during the fiscal year ended June 30 last was:

Halifax extension.....	\$7,164.02
St. John deep water terminus.....	94,545.85
Construction of railway, old accounts.....	23,931.67
Purchase of Riviere du Loup Branch.....	1,500,000.00
Repairs and improvements on Riviere du Loup Branch.....	369,799.00
Rolling stock on Riviere du Loup Branch.....	19,795.47
Nut locks.....	32,797.83
Total.....	\$2,048,014.80

The road has thus cost the Dominion \$45,940 per mile. Thus far it has returned nothing directly.

The earnings for the year were as follows:

1879-80.	1878-79.	Inc. or Dec.	P. c.
Gross earnings.....	\$1,508,298.48	\$1,294,069.69	I. \$212,108.79 16.4
Expenses.....	1,603,429.71	1,841,787.19	D. 238,357.48 12.9
Deficit.....	\$97,131.23	\$547,687.50	D. \$450,556.27 82.3
Gross earn. per mile.....	1,771.98	1,812.46	D. 40.48 2.2
Per cent. of exps.....	100.45	142.32	D. 35.87

The receipts from passenger traffic show an increase of \$48,445.57 over those of last year. The returns of the freight traffic show an increase in the receipts of \$161,995.65 over those of last year, and an increase of 51,063 tons in the amount carried.

The earnings of the first three months of the current fiscal year show an increase of \$80,000 as compared with the earnings for the corresponding period last year.

Kentucky Central.

The road owned by this company consists of the Kentucky Central, from Covington (opposite Cincinnati) south to Lexington, 99 miles, and the Maysville & Lexington, Northern Division, from Paris northeast to Maysville, 49.5 miles, making 148.5 miles in all. The controlling interest in the road has lately changed hands, as noted in our pages.

The fiscal year having been changed to end with December instead of April, the report presented at the annual meeting last week was only for eight months, from May 1 to Dec. 31. The earnings for this period were:

Passage.....	\$143,105.28
Freight.....	278,853.63
Mail, express and miscellaneous.....	25,119.30
Total (\$3,010.63 per mile).....	\$447,078.21
Expenses (67.88 per cent.).....	303,461.79

Net earnings (\$967.11 per mile).....\$143,616.42

The report of President Ernst says: "During five months of the time embraced in this report rates for transportation of freights and passengers were greatly demoralized, owing to the action of others over whom we had no control. This seriously affected the earnings, especially from freights. Another cause operated to lessen the freight earnings. Owing to an extensive failure of the wheat crop in the South, the crop in Central Kentucky was mostly sent South instead of North as heretofore. Yet, notwithstanding these unfavorable conditions, the books show an increase in the freight earnings compared with the earnings during the corresponding month of the preceding year of \$6,737.67, and in the passenger earnings of \$9,075.15."

Concerning the proposed extension of the road southward, the report says: "The Louisville & Nashville Railroad Company has agreed to extend its Knoxville Branch from Livingston, its present terminus, to the Tennessee state line, in the direction of Knoxville, and the Knoxville & Ohio road, which is now in operation from Knoxville to Caryville, has agreed to extend its line to a connection with the branch of the Louisville & Nashville Railroad. And the Kentucky Central has secured the privilege of connection with the right of traffic, substantially which it sought. To secure, therefore, to the Kentucky Central the advantages of a direct connection with Knoxville, Tenn., and thence with Southwest Virginia, North Carolina and South Carolina systems of railroads, also with Atlanta, Ga., and all points in the South connected by rail with that important railroad centre, it is only necessary to extend its road to a connection with the Knoxville Branch of the Louisville & Nashville road."

Illinois Central.

The directors' report for the year 1880, published in advance of the full report, gives the following statements of the earnings of the road:

1880.	1879.	Increase.	P. c.
Gross earnings.....	\$8,304,811.81	\$7,234,464.06	\$1,070,347.75 14.8
Expenses, taxes and rentals.....	4,825,780.20	4,037,543.21	788,235.99 19.5
Net balance.....	\$3,479,031.61	\$3,196,920.85	\$282,091.76 8.8
Gross earn. per mile.....	6,286.76	5,739.92	546.84 9.1
Net balance per mile.....	2,633.62	2,545.32	88.30 3.5

The report of the directors in full is as follows:

"The directors are gratified in reporting an increase in traffic for 1880—both gross and net—as compared with that of the previous year. The gross earnings for the past year were \$8,304,811.81, against \$7,234,464.06 for 1879. The tonnage has largely increased. The gain in net was \$282,091.76. In the accompanying abstracts net returns for 1880 are as shown below:

From traffic.....	\$3,479,031.61
" land.....	156,520.36
" interest on bonds.....	112,000.00
Total.....	\$3,747,532.97

"From this sum, besides paying interest on debt and dividends on shares, permanent improvements were made to the extent of \$842,323.56, including the relaying of 115 miles of track in steel, the construction of three iron bridges, 9 heavy freight engines and 227 cars, also additional double tracks at the entrance to Chicago, and a new dock. There was still a balance from the year's operations, of \$501,641.14.

"In 1877-1878 the permanent expenditure account was reduced \$3,816,675.40, leaving the charge to this account at \$33,000,000, at which point it has stood for two years, the capital expenses being taken from current income.

"The branch line, running southwest and west from Otto, has been extended to a junction with the Northern Division at Minonk, giving us a second independent connection between that division and the Chicago Branch. As yet, the new line is not represented by bonds or other obligations beyond the \$200,000 shown in the last annual statement.

"Sixteen thousand tons, additional, of steel rails have been purchased, and when laid, will complete in steel the entire original line. The pressure of the business for the past year has made it necessary to order at least 500 more cars, and it will be the aim of the management to avoid restriction of traffic from want of rolling stock.

"The operation of the New Orleans line has been attended with absolute success. The 550 miles from East Cairo to New Orleans will have been entirely rebuilt the coming autumn, the grades reduced to a maximum of 35 feet, the important bridges replaced with iron, the superstructure thoroughly renewed. Since the present management took possession 49,000 tons of steel rails have been purchased, and the last of these will be laid the coming summer, following which, the running time from Chicago to New Orleans can be reduced to 36 hours. The renewals of this line have been chiefly derived from its surplus income, after paying current interest on all bonds prior to those issued under the new second mortgage. The interest on these last does not become a mortgage obligation until after December, 1882. No floating debt has been created in the course of thoroughly equipping this line for business. The traffic has greatly improved, amounting last year to \$3,711,000. This year's income will supply the means necessary to make it a first-class railway. Through traffic has increased so rapidly that, in view of delays occurring at East Cairo in the transfer to the Southern gauge, the management has several times reported the necessity of suspending the shipment of freight altogether. A change of gauge to correspond to that of the Illinois Central is imperative, and will be made this year.

"The board has decided to enter into a plan reducing the fixed interest charge on the New Orleans Line, and offering to holders of all classes of bonds thereon a new 5 per cent. bond, to be dated the 15th of June next, and made payable in 1951; the Illinois Central holding of first and second mortgage bonds to be exchanged into the new security. The like even exchange will doubtless be accepted by the holders of say \$5,000,000 of 8 per cent. bonds to mature within the next five years, as well as by holders of the new second mortgage bonds. Ultimately it is likely to be accepted by the old bondholders generally, even before the maturity of their bonds, for the new security promises to command a premium beyond the current value of the early maturing 8 per cents. The Illinois Central Company remains the owner of \$6,661,000 bonds of undoubted security, and holds, also, \$6,670,000 in shares of the New Orleans Line, that is, two-thirds of the whole capital. The present traffic points to a return on the share capital which will be helped by the reduction of the interest charge.

"The directors request the shareholders to note the fact that the investment in the New Orleans Line, valued on the books at \$9,299,522.43, is the unincumbered property of this company. At some future day it may be deemed advisable to sell part of the bonds of that line, proportionately discharging the Illinois Central debt, which has been already reduced to \$12,000,000. The accounts show the absorption, into a fund designated as the 'investment fund,' of the net income surplus of 1880 and previous years, leaving the credit to that fund \$5,395,059.50.

"The board has under consideration the construction of a bridge across the Ohio River at Cairo."

Indiana, Bloomington & Western.

This company makes the following statement for the year ending Dec. 31, 1880.

The earnings for the year were as follows:

Gross earnings (\$5.644 per mile).....	\$1,196,416.58
Expenses (53.94 per cent.).....	639,053.36
Net earnings (\$2.483 per mile).....	\$527,363.22
Fixed interest charges.....	\$192,000
Income bonds, 6 per cent.....	90,000
Surplus for the year.....	\$245,363.22

Expenses include taxes and track rentals. With the large through business accruing from the completion of the new road, and the lease of the Cincinnati, Sandusky & Cleveland road, it is believed that the net earnings will be largely increased.

The Secretary issues the following notice:

"In answer to inquiries from stockholders I would say that it is proposed in the consolidation, which will be effected March 15, that the present stockholders shall receive two shares of the new company's stock for each one of the old. It is intended to have the new road finished by Oct. 1, in time for the fall business."

Delaware Western.

This company owns a line from Wilmington, Del., to Landenberg, Pa., 20 miles. The following statements for the year ending Dec. 31, 1880, were presented at the recent annual meeting.

The earnings for the year were as follows:

1880.	1879.	Inc. or Dec.	P. c.
Passengers.....	\$12,406.28	\$11,385.97	I. \$1,020.31 8.9
Freight.....	42,260.13	38,017.44	I. 4,242.69 11.2
Mail, etc.....	4,519.94	3,936.16	I. 583.78 15.0
Total.....	\$59,186.35	\$53,339.57	I. \$5,846.78 11.0
Expenses.....	53,068.22	43,793.81	I. 9,274.41 21.2
Net earnings.....	\$6,118.13	\$9,545.76	D. \$3,427.63 35.9
Gross earnings per mile.....	2,959.32	2,666.98	D. 292.34 11.0
Net ".....	305.91	477.29	D. 171.38 35.9
Per cent. of expenses.....	89.64	82.16	I. 7.48

Expenses include all renewals. There was \$1,785.40 expended for new property, leaving a surplus of \$4,332.73 for the year.

The present company acquired the road through foreclosure, and there is no bonded debt and no interest charge.

After mature consideration the directors deem it advisable to put the money which had heretofore been paid for dividends upon the road, and this, with the increased receipts, have enabled the company to very much improve and renew the road.

The principal work has been as follows: To remove the freight house from the south side of the Christiana to the foot of Shipley street, where a convenient building, with the necessary weighing scales and other appliances, has been erected. Several new sidings have been put in, which will increase the business of the road. These expenses may fairly be considered as extraordinary. For the first time in the operation of the road, the trestles and bridges have had, with the exception of two of the Red Clay bridges, a thorough overhauling. Over 7,000 cross-ties have been put in, and 30 tons of steel rails have replaced worn-out iron ones. The rolling stock has required no extensive repairs, and is in general good order, excepting some flat cars, which need renewal. Several culverts and crossings have been renewed, and, with the exception of the track on the south side, which needs overhauling, the road in all its departments is in excellent order.

Some attention has lately been called to the road from the possible use of its charter through Delaware for a new line between Baltimore and Philadelphia.

Worcester & Nashua.

This company owns a line from Worcester, Mass., to Nashua, N. H., 46.09 miles, and it leases the Nashua & Rochester road, from Nashua to Rochester, 48.39 miles, making 94.48 miles worked. There are 16.83 miles of second track and 13.79 miles of sidings on the line owned; 17.50 miles of track are laid with steel.

The latest report of the company is for the year ending Sept. 30, 1880.

The equipment consists of 19 engines; 3 parlor, 19 passenger and 7 mail and baggage cars; 238 box, 100 platform and 100 coal and gravel cars; 3 snow-plows.

The general account is as follows:

Stock (\$39.173 per mile).....	\$1,789,800.00
Bonds (\$21.887 per mile).....	1,000,000.00
Unclaimed dividends and interest.....	3,894.50
Profit and loss.....	172,877.72
Total.....	\$2,966,572.22
Road and equipment (\$54,980 per mile).....	\$2,512,007.74
Stocks and bonds.....	27,630.00
Accounts and balances receivable.....	37,945.11
Materials.....	53,249.88
Cash.....	65,679.49
Total.....	\$2,966,572.22

During the year the 4,753 shares of Nashua & Rochester stock held was decreased in value on the books from par to 60 per cent., the balance of 40 per cent., or \$190,200 being charged off against profit and loss.

The traffic for the year was as follows:

Train mileage:	1879-80.	1878-79.	Increase.	P. c.
Passenger.....	196,464	190,839	5,625	2.9
Freight.....	220,591	183,559	37,032	20.2
Service and switching.....	45,607	32,068	13,539	42.2
Total.....	462,662	406,466	56,196	13.8
Passengers carried.....	371,019	322,925	48,094	14.9
Passenger miles.....	6,784,960	6,168,871	616,089	10.0
Tons freight carried.....	467,479	382,163	85,316	22.3
Ton miles.....	14,995,020	12,123,444	2,871,576	23.7

Av. train load:

Passengers, No.....	34.53	32.33	2.20	6.8
Freight, tons.....	67.97	66.05	1.92	2.9

The increase both in passenger and freight traffic was very large, indicating a general increase of activity. The figures show that passenger traffic gained most in local, and freight in through business.

The earnings for the year were as follows:

1879-80.	1878-79.	Increase.	P. c.
Passenger Dep't.....	\$214,386.31	\$193,890.71	\$20,495.60 10.6
Freight Dep't.....	339,206.31	279,191.17	60,015.14 21.5
Rents, dividends, etc.....	22,287.85	20,912.60	1,355.25 6.5
Total.....	\$575,880.47	\$493,994.48	\$81,885.99 16.6
Expenses.....	386,539.22	307,587.63	78,951.59 25.7

Net earnings.....\$189,301.25
Gross earn. per mile.....\$2,406.85
Net earn. per mile.....\$1,972.56
Per cent. of expenses.....67.13

Included in rents, etc., is the sum of \$14,259 dividends on Nashua & Rochester stock owned, which should really be deducted from the rental paid for that road.

There were 302 tons steel rails and 19,465 ties used in renewals, the full amount being charged in expenses.

The payments from net income were as follows:

Net earnings.....	\$189,301.25
Interest on bonds.....	\$50,000
Rent of Nashua & Rochester road.....	74,274
Total.....	124,274.00

Balance credited to profit and loss.....\$65,027.25

The gross earnings of the Nashua & Rochester (included above) were \$106,340.60, or \$2,198 per mile; working expenses, \$65,919.50; net earnings, \$40,421.10. The rental being \$74,274, there was a deficit of \$33,852.81.

On Jan. 1, 1881, since the close of the fiscal year, \$75,000 of bonds matured. Of these \$38,000 were paid, and \$37,000 remain at 5 per cent., to be paid from future earnings. The board decided to take this course and use part of the surplus for a dividend, and one of \$1.50 per share was paid Jan. 1. It is expected that semi-annual dividends can be continued. The floating debt has all been paid off.

Taxes and insurance increased \$8,690.93, chiefly on account of the increase in market value of the stock.

The equipment was thoroughly repaired and the Westinghouse automatic brake put on all the passenger equipment. Extensive repairs were made to the buildings in Worcester, and new coal sheds built. Facilities for delivery of freight were also increased. The yard at Ayer Junction has been enlarged. There was paid for land taken to reach the new station in Worcester and for viaduct land damages, \$15,391.96. There was received in settlement of viaduct claims \$7,500, and for land sold the Norwich & Worcester Company, \$8,250. The old rails on hand were sold for \$35,175. A settlement has been made with the Boston & Albany, this company receiving \$28,816.50 for the old station in Worcester and certain tracks.